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COMMONWEALTH OF PENNSYLVANIA.

DEPARTMENT OF AGRICULTURE.

BULLETIN NO. 79.

RABIES,

BY

MAZYCK P. RAVENEL, M. D.,

Bacteriologist of the State Live Stock Sanitary Board of Pennsylvania.

PUBLISHED BY DIRECTION OF THE SECRETARY.

1901.

WM. STANLEY RAY,
STATE PRINTER OF PENNSYLVANIA.
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PREFACE.

Harrisburg, Pa., July 1, 1901.

The following Bulletin, No. 79, on Rabies, by Mazyck P. Ravenel, M. D., Bacteriologist of the State Live Stock Sanitary Board of Pennsylvania, was prepared at the request of the Department of Agriculture, partly for the purpose of correcting erroneous views on the part of some members of the medical profession, as to rabies being a distinct disease, and partly to call attention to the prevalence and dangerous character of this disorder.

In this, as in most other problems affecting the public health, the solution lies largely in prevention, and when people come to realize more fully their danger from hydrophobia, they will be more cautious in dealing with animals showing symptoms of rabies, and by confining such as are suspected of being affected, will assist in eradicating the disease.

Dr. Ravenel has had extended experience in diagnosing cases of rabies, and is, therefore, both by personal experience, as well as by careful study of the subject, thoroughly conversant with the facts which he relates.

The Bulletin is issued in the hope that it may protect live stock, and also save human life.

JOHN HAMILTON,
Secretary of Agriculture.

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RABIES.

SYNONYMS:

English, *hydrophobia*, *madness; French*, *rage and hydrophobie; German*, *hundswuth*, *tollwuth*, *wuthkrankheit and wassersheu; Italian*, *idrofobia and rabbia Lyssa.*

Rabies is an acute and very fatal disease, communicated from animal to animal, or from animals to man by the bite of an animal which already has the disease. As seen under natural conditions, it is always an inoculation disease, that is, communicated directly through a wound usually inflicted by the teeth, and the infective material being the saliva, which contains the poison or virus.

HISTORY. The history of rabies dates back into remote times, having been described distinctly by Aristotle, who lived in the year 326 B. C. He said: "Dogs suffer from madness, which puts them into a state of fury and all the animals that they bite when in this condition become also attacked by rabies." References to it are found in many of the authors prior to the Christian era, and from that date up to the present time, with the exception of the Middle Ages. In the first century of the Christian Era, we find the first description of rabies in the human being and the name "hydrophobia" given to it; this name being by common usage at the present time properly restricted to the disease as seen in man. The term means "fear of water," a symptom seen often in man, though not always, and which is not at all characteristic of the disease. It is not observed in the lower animals, and mad dogs will often lap water, and will even swim across streams.

As early as 1591, we find recorded the transmission of the disease by wolves to man. In 1803, and for a number of years following, it was epizootic among foxes in southern Germany and Switzerland.

During the later years of the eighteenth and the beginning of the nineteenth century the disease spread over the whole of Europe, and about this time made its appearance in America, the first outbreak in America being reported from Boston, 1768. In 1770-1771 it was observed in dogs and foxes in the vicinity of Boston; in the year 1779 it appeared in Philadelphia and in the State of Maryland, and in the year 1785 it was prevalent throughout the northern States, and soon after this time spread to the southern part of this country. During the last century it has inflicted severe losses throughout Europe, including England, and in America.

Its fatal character in animals, and especially in man, has attracted the careful study of many of the most able men who have ever adorned the ranks of the medical and veterinary professions. Among the famous men who gave great attention to it may be mentioned the great surgeon, John Hunter in England, Viborg in Copenhagen, Waldinger in Vienna, Hertwiz in Germany and Pasteur in France. Without detracting in the least from the great work of other investigators, we may say that to Pasteur and his co-laborers, Nocard and Roux, we owe most of the knowledge which we have of the disease at the present day.

Distribution. At the present time rabies is known in almost every country on the globe, Australia being the only one which is absolutely exempt, owing to the rigid quarantine enforced against the importation of dogs. It is most common in France, Belgium and Russia. In the latter country it is perhaps more often seen in wolves than any other part of the world. In Holland, Denmark and Sweden it is very rare. In England it has from time to time been wide-spread, but at the present time, owing to strict measures, it has been practically stamped out.

The careful inquiries of Dr. Salmon, Chief of the Bureau of Animal Industry, show that rabies is seen in practically every part of the United States. The census for 1890 reported 143 deaths in man, distributed in thirty States. The figures for the census of 1900 are not available, but Dr. Salmon has collected from health officers the reports of 230 deaths occurring in seventy-three cities since 1890.

There is no systematic report of rabies in the lower animals in Pennsylvania, or any other State, so that it is impossible to give any idea of the number of dogs or other animals affected yearly. There is no doubt, however, that the disease is more prevalent than is generally believed, and there is good reason to fear that it will increase until uniform and efficient laws are adopted for its suppression. The laboratory of the State Live Stock Sanitary Board has investigated 82 cases of rabies, as proven by inoculation and microscopic examination, since October, 1897. Of these 58 were dogs, 4 horses, 17 cows, 1 cat and 2 human beings. All of these except six dogs and one person were from the State of Pennsylvania. A number of other cases have been seen in dogs at the Hospital of the Veterinary Department of the University of Pennsylvania during the past three years.

It is impossible to say what relation these recorded cases bear to the total number which have occurred throughout the State during the same period of time, but they indicate that the disease is more common than is generally suspected.

Animals Affected. All mammifers, including man, are liable to rabies. Birds also may contract the disease. The dog is the animal most constantly affected, but it is seen not infrequently in wolves, foxes, hyenas and jackalls. Rabies in the cat is relatively rare and usually caused by the bite from a dog with which it is associated. Cattle, sheep and goats are affected in relatively about the same degree, cattle and sheep being especially exposed. It is more rarely seen in the horse. Swine contract the disease less frequently than other domestic animals.

The money losses from this source reach a very high figure. In the State of Pennsylvania the loss of stock each year is not inconsiderable, although not reaching a very high figure. During the past year in one herd of sixty cows, eleven died of rabies, worth about $600.00. Several outbreaks have occurred also among sheep, in one flock twenty out of fifty having died.

In England the losses among deer in several parks have been very heavy. In 1889 rabies appeared among the fallow deer at Richmond, and soon after in the park of the Marquis of Bristol. In the course of three months more than 450 died out of the herd, which contained between 600 and 700 animals.

The disease is rarely transmitted from one of the domestic animals to another. Bites from these animals are less dangerous than from dogs on account of the blunt character of their teeth, which inflict contused wounds rather than punctured ones. The disease may, however, be transmitted in this way, and also by the deposit of virulent saliva on wounds of the skin by licking. Deer are said to be able to transmit the disease to others by biting.

Cause of the Disease. Nature of the Virus. Although we have every reason to believe that rabies is due to a specific germ, all attempts to isolate it have so far failed. We, however, understand much of the nature of the virus, the condition which affect it, etc.

In rabid animals it is found principally in the saliva and in the central nervous system, although it is known to pass sometimes into other glands as the lachrymal and pancreas and also into the milk. It has never been found in the blood or in any of the organs such as the liver, spleen and kidneys, nor is it ever contained in the muscular tissues. The contents of the stomach may contain it, owing to the swallowing of the saliva previous to the paralysis of the throat. It affects principally the central nervous system, and it is found most certainly, and in the most concentrated condition in the medulla oblongata. The virus may be present in the saliva for at least three days before the animal shows any symptoms of madness, as proven by Roux and Nocard, and, perhaps, as long as eight days. It may be present in the central nervous system for two days before the appearance of symptoms. The symptoms do not show themselves until the poison or virus has remained in the nervous tissues long enough to bring about changes in their structure and functions.

Method of Invasion. When introduced into another animal either experimentally or in the natural course of the disease, the virus remains for a time without producing either local or general symptoms, undergoing a period of incubation during which it undoubtedly multiplies itself, in this respect corresponding to the well known infectious diseases. It may be removed from the saliva by filtration through porcelain, proving that it is a solid body. The virus penetrates to the nervous system by following the nerve trunks from the site of injury to the spinal cord, then the spinal cord to the medulla and brain. This has been proven by inoculating an animal in one of its legs with virulent material. After a suitable time, but before the symptoms of rabies appear, if the animal be killed, the virus will be found in the nerves of the limb, and even in the part of the spinal cord into which the nerves enter, while the upper part of the cord and brain will be free from it. This fact explains the reason why the earliest symptoms, both in man and animals, such as pain, itching, tingling, numbness and other nervous sensations, often appear in the part of the body which received the virus through the bite. In the case of a bite about the face and head the route along the nerves to the central nervous system is shorter still. While the nerves then form the main route by which the virus travels, the circulation may at times assist, especially in small animals. Inoculation into the large nerve of the leg is almost as certain to produce the disease, as inoculation directly into the sub-dural space, while injection beneath the skin of the leg is not so sure.

Resistance of Virus. The action of the virus is destroyed by drying, and by the action of light. In dry air protected from the light and from putrefaction, the virulence of the spinal cord of rabbits is destroyed in fourteen to fifteen days. When spread in thin layers the virus is destroyed entirely by drying in four to five days. Sunlight destroys it in about forty hours. The loss of virulence by drying is gradual and quite regular, and this is taken advantage of in the preparation of the "vaccine," which is described later. The virus may be preserved unchanged in neutral glycerine at ordinary temperature for a long time. Roux found that after four weeks in glycerine at 30 degrees C., the virus has the same power as when perfectly fresh.

It is quite resistant to putrefaction. Galtier has found the virus active in the central nervous system of rabbits buried for twenty-three days, of sheep buried thirty-one days, and of dogs buried forty-four days. Other observers have found it still active in animals buried for twenty-four days.

It is destroyed completely by a temperature of 50 degrees C. (122 degrees F.) in one hour, or 60 degrees C. (140 degrees F.) in one-half hour. It is uninjured by exposure to extreme cold, resisting the prolonged application of a temperature from 10 degrees to 20 degrees below zero, centigrade.

Its activity is destroyed in one hour by a 5 per cent. solution of carbolic acid, or by a 1 to 1,000 solution of corrosive sublimate. Water saturated with iodine destroys it in ten minutes.

Danger from Bites. The danger of infection as well as the time elapsing between the introduction of the poison and the development of the disease is dependent upon a number of factors. The disease appears more quickly in children than in older persons, and for obvious reasons they are more often attacked by dogs, and the bites are more apt to be on the face and head. Wounds about the head and face are particularly dangerous, next comes bites about the hands, and lastly, other parts of the body. The richer the nerve supply of a part the greater the danger. Punctured wounds are most dangerous, and lacerated wounds are dangerous in proportion to the extent of the surface afforded for the absorption of the virus. The danger of infection varies with the animal which inflicts the bite. First, comes the wolf; second, the cat; third, the dog, and, fourth, other animals. In the western part of the United States the skunk is said to be very liable to the disease, and the bite from this animal is quite dangerous. Bites on naked or exposed parts of a person are more dangerous than through clothing, in the latter case the virus being wiped off and not gaining access in quantity to the tissues. The same thing is observed among the lower animals, as dogs with long hair, like the spaniel and the collie, are less liable to the disease than are short-haired dogs. Experimentally, it has been shown that rabbits which are shaven and exposed to the bite of a mad dog are more often affected than are those bitten through the fur, even when the teeth penetrate deeply beneath the skin. The proportion of persons who contract hydrophobia after being bitten by mad dogs, and are not treated, is conservatively estimated at 16 per cent., but some series of cases give a much higher mortality. Thus, of 855 cases collected by Tordieu, Thamhayn and Bouley, 399 ended in death, or 46.6 per cent. In another series of cases given by Bouley, out of 266 persons bitten, 152 died of hydrophobia; but of these, 120 were bitten on the face and hands, the greater danger from which has been mentioned.

The mortality following bites from wolves is placed at from 60 to 80 per cent., the increased danger from these animals being due partly to the greater activity of the virus as found in them, and partly to their mode of attack, wounds about the face and heads being common, and the wounds being very extensive.

Of animals bitten by rabid dogs, it is claimed that only from 20 to 30 per cent. become infected. Röll calculated that during the years 1877-1887 the percentage in horses was about 40, among cattle and sheep, 50, among pigs, 36, and among goats, 20. It will be seen from these figures how unnecessary it is to destroy all animals bitten by dogs believed to be or even known to be made.

PERIOD OF INCUBATION. By the period of incubation is meant the time which passes between the introduction of the virus or germ of a disease, and the appearance of the symptoms. This is quite variable in rabies, depending on the site of the wound, which is almost always a bite, the amount of virus introduced, and the strength of the virus. In general it may be said for all animals that the period of incubation seldom exceeds sixty days, though in man and in some of the larger animals, it sometimes, though very rarely, reaches one year. The average period is as follows:

In man, 40 days.
In dogs, 21 to 40 days.
In horses, 28 to 56 days.
In cows, 28 to 56 days.
In cats, 14 to 28 days.
In pigs, 14 to 21 days.
In goats and sheep, 21 to 28 days.
In birds, 14 to 40 days.

INFLUENCES OF SEASONS. It has been for a long time believed, and apparently with a certain degree of truth, that rabies in dogs is more frequent during the hot months than at other periods of the year, and as a result of this we would expect to find more persons bitten during the periods of extreme heat than during the rest of the year. The old statistics in France, dating from the year 1850 to 1876, indicate that 30.4 per cent. of all cases of rabies occurred during the months of June, July and August. The figures collected at the Pasteur Institute in Paris do not, however, agree with these, the maximum number of bitten persons applying for treatment there during the years 1886 to 1893 being in March, April and May, and the minimum number in September, October and November. The statistics collected by Bouley give for December, January and February, 755 cases; March, April and May, 857 cases; June, July and August, 788 cases, and September, October and November, 696 cases, showing a fairly uniform distribution for the whole year. The maximum number, occurring during March, April and May, agrees with the figures of the Pasteur Institute.

I quote a table compiled by Dr. Salmon, Chief of the Bureau of Animal Industry, giving the occurrence of 14,066 cases by months:

Cases of Rabies in Dogs, by Months.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Bourrel, ...	36	31	26	32	32	42	32	30	35	41	24	32	393
Saint Cyr, ...	12	15	6	15	13	7	4	9	1	3	......	2	87
Hogyes, ...	309	310	314	367	450	502	580	537	455	438	3 3	396	4,961
Leblanc, ...	103	97	121	192	155	138	147	123	1 4	117	95	100	1,492
France:													
1895, ...	89	155	153	184	181	129	157	147	133	110	105	149	1,692
1896, ...	124	138	151	150	147	199	138	117	131	125	103	164	1,687
1897, ...	131	151	189	202	225	172	192	154	136	131	150	140	1,973
1898, ...	139	148	......	181	216	278	185	177	150	......	153	154	1,781
Total, ...	943	1,045	960	1,323	1,419	1,467	1,435	1,294	1,145	965	933	1,137	14,066

The highest number of cases occurred in June, and the smallest number in November. Taking the total result as given by this table, in connection with the other figures quoted, it may be said that more cases of rabies occur from April to September, inclusive, than during the rest of the year. In giving a proper value to these figures it must be noted that during the warm months of the year, dogs are more apt to be running abroad, while during the winter months they are more apt to be housed. In this way opportunities for contagion are greater from April to September than from October to March, and there is no evidence that of itself that season has anything to do with the greater or less frequency of rabies.

Erroneous Ideas Concerning Rabies There is a rather widespread belief that if a dog which has bitten a person ever goes mad the bitten person is also liable to go mad, and this superstition leads to the useless destruction of a considerable number of dogs. It probably has its origin in the fact that the virus is present in the saliva for several days before symptoms of madness are shown by the dog, and that certain persons have contracted hydrophobia following the bite of such an animal, which, at the time, showed no symptoms of madness. It can be stated with the most absolute certainty that the bite of a healthy dog, or a dog suffering from fits, or when angered or excited, can produce no ill effects in the bitten person other than that dependent on the extent of the injury. Such wounds should be treated by modern antiseptic methods, cauterization being unnecessary.

The Mad Stone. Persons bitten by dogs strongly suspected of rabies should at once take the advice of a competent physician, and if the diagnosis is confirmed, go as rapidly as possible to some institution where the Pasteur treatment can be applied. No dependence whatever can be placed upon the so-called "mad-stones."

Pseudo-Hydrophobia, or Lyssophobia. It is to be regretted that the opinion is so wide-spread, even among some physicians, that fright following the bite of a dog can bring about symptoms of hydrophobia, followed by death. It cannot be denied that such symptoms do sometimes occur in persons bitten by dogs known to be free from hydrophobia, but the writer has failed to find reliable report of any death in such cases. Recovery usually takes place in a few days under very simple treatment, though the symptoms sometimes persist for a considerable time, ending, however, in complete recovery.

Can Rabies or Hydrophobia Arise Spontaneously? It is supposed by some persons that rabies can be produced by fright, fatigue, anger, jealousy, high feeding, excessive heat and other influences—an error which was pointed out by Virchow in Germany many years ago.

After what has been said of the nature of the virus it is manifest that this is impossible. Each case of rabies is due to contagion from some other case just as truly as each case of measles or scarlet fever in children is due to the germ from some other case gaining entrance to the system. Rabies cannot arise of itself from any cause.

Dog Days. The belief that dogs are particularly apt to go mad during the so-called dog-days is shown by the law, still enforced in some places, requiring the muzzling of dogs during this period. As has been shown in another part of this article, rabies occurs during every month of the year.

The term "dogs days" refers to the "dog star," Sirius, and was originally applied to the period of time during which the dog star was above the horizon with the sun. At present they are usually reckoned from July 3 to August 11, inclusive. Dogs are not more liable to go mad during this period than at other times.

RABIES IN MAN. The course of the disease in man may be divided into three stages, a premonitory stage, a stage of excitement and a paralytic stage.

In the first stage there is usually irritation about the point of inoculation, or else pain, numbness or a tingling sensation; depression and melancholy are observed, the disposition becomes irritable, and there is a sense of great fatigue with restlessness and often a feeling of impending danger; the sensibilities are increased, noise or light causing distress. The first difficulty in swallowing may appear. During this stage the voice becomes husky. The pulse and temperature are increased.

In the second stage the chief symptoms are great excitability and restlessness, and hyperaesthesia is marked: "Any efferent stimulant—i. e., a sound or a draught of air, or the mere association of a verbal suggestion—will cause a violent reflex spasm. In man this symptom constitutes the most distressing feature of the malady. The spasms, which affect particularly the muscles of the larynx and mouth, are exceedingly painful and are accompanied by an intense sense of dyspnoea, even when the glottis is widely opened or tracheotomy has been performed." (Horsley.) These spasms are brought on by any attempt to drink water, or by touching with a wet towel, and so painful is the result that patients come to dread the sight of water or even liquids of any sort. It is from this symptom that the name of hydrophobia (dread of water) is derived. There may be maniacal symptoms with the spasms, and occasionally furious mania is seen. This is exceptional, however. During the spasms difficulty of breathing occurs, and curious sounds may be uttered from which the exaggerated reports of people barking like dogs arise. This stage lasts from a day and a half to three days and is succeeded by the final or paralytic stage, which ends in death in from six to eighteen hours, the heart's action becoming more and more feeble and death occurring from syncope.

Rupture of the muscles during the convulsions may take place and give rise to distressing symptoms. Emphysema, or a filling up of the loose tissues under the skin with air coming from the lungs through tears in the pleurae also occurs at times.

RABIES OF THE DOG. The disease is seen in two types, a furious, and tranquil or paralytic type.

Furious Type. In the furious type the first symptoms consists solely in changes in the disposition of the animal, which are manifested by distress or uneasiness, and restlessness. He is always easily excited. At this stage, the animal does not usually show a disposition to bite; he is still docile and obeys orders, though not so quickly as in health; he soon seeks solitude and shows a disposition to hide in dark corners, or burrow in the straw of his kennel; periods of calmness alternating with marked excitement are observed; he still shows affection for his master and may respond to caresses even more affectionately than is his wont. He may, however, be irritated by strangers, or being surprised by touch or blow, may inflict a bite. The appetite is still good and may be even excessive. Soon the restlessness becomes more marked; the dog is constantly in motion; he is apt to tear carpets, rugs, etc., which may be in the room with him; he shows signs of delirium, looking off into space, apparently seeing some imaginary object; at times he will attack an imaginary enemy. He will still respond to his master's voice, but his attention cannot be held for any length of time. At this early stage, the voice becomes modified, and this may be regarded as one of the most typical symptoms. Instead of the clear and sharp bark which is natural, the latter part of the note becomes prolonged and of a higher pitch, going off into a plaintive cry, which has been likened to that of a dog fatigued in the chase, and in succeeding short barks which may follow, the jaws do not close completely as in ordinary barking.

While this symptom is a striking one and quite constant, it may be lacking at times and certain dogs remain quiet in spite of all attempts to excite barking. The appetite diminishes about this time; food is taken with more or less difficulty, and soon it is refused, swallowing having become painful and difficult. The animal may appear to have a bone stuck in its throat, a symptom which often tempts the owner to make the dangerous examination for some obstruction. There is no fear of water, and the animal drinks water and other liquids quite greedily, until paralysis of the constrictor muscles of the pharynx makes swallowing impossible.

The excitation becomes marked and the animal is now furious. If a stick or other article is presented to him he seizes it with power; he attacks the bars of his cage or any object in the cage. If at liberty, he attacks every object in his way, swallowing all sorts of articles, such as wood, paper, straw and stones, the presence of which in the stomach after death is one of the most striking features of the disease. At this time he begins to wander, running with his tail hung, the mouth open and the eyes with a wild look; he attacks every object or animal which comes in his path. As a rule, he runs straight ahead and does not turn out of his way to attack animals. The dog may travel tremendous distances, but is apt to return to his home, exhausted and covered with dust and blood, or else he may continue his course until he falls exhausted, as much as fifty miles being covered. Very soon paralysis sets in, commencing in the hind legs, and finally becomes general. The dog is no longer able to stand; the weakness becomes more marked and stupor sets in, from which the animal may be aroused, but which becomes deeper and deeper, and ends in death. The course of the disease is always rapid, covering from six to ten days, and averaging from four to five days. The symptoms are so characteristic that once seen can scarcely be mistaken for any other disease. The furious type just described is the most common.

Paralytic Form. The paralytic type, ordinarily spoken of as "dumb rabies," constitutes from 15 to 20 per cent. of all cases. In certain countries, as in Turkey, it is the prevailing type, which explains the relative rarity of rabies in man in this country where dogs abound. The commencement of the disease is the same as in the furious type, but the accesses of fury are lacking. For several days the dog appears restless, seeking seclusion and dark places. The paralysis may commence in various parts of the body, but, as a rule, affects first the muscles of the jaw, which soon drop, the dog being unable to close its mouth, and the tongue hanging out;

the whole expression of the animal is pitiful in the extreme; an abundance of saliva runs from the mouth; the taking of water is impossible; the mouth becomes dry and covered with dust, and brownish. The animal is quiet; it does not respond to provocation, nor does he seem to wish to bite. The progress of the disease is more rapid than in the furious type. The paralysis extends and death occurs on the second or third day.

Other cases are observed in which the type of the disease is more or less intermediate between the two just described. There are some in which a very short period of fury is followed by a rapid paralysis, while in others the paralysis is more slow in its progress and the animal shows a slight disposition to attack when irritated. In the "dumb" type of the disease it is common to suspect an obstruction in the throat, and in the attempt to locate it the saliva may infect wounds of the hand. The animal never wanders and, being unable to bite, the danger of transmission of the disease is slight.

RABIES OF THE CAT. This animal shows first a period of restlessness, with a disposition to hide in dark corners. It soon becomes furious and leaves its place of retreat and is liable to attack any one who comes within its reach. The bites inflicted by it are, as a rule, very serious. It shows the same perversion of appetite as seen in the dog. After five or six days paralysis of the hind legs begins; swallowing becomes impossible and death soon follows. The paralytic form, or "dumb" rabies also occurs, causing death in from three to four days.

RABIES OF THE HORSE. In the horse, excitement is an early symptom, with a marked sensitiveness of the skin, and hallucinations. If it can reach the point of inoculation, it bites itself constantly, tearing the skin and often the deep tissues. The appetite ceases, or becomes capricious and irregular. Like the dog he eats earth, wood or anything within his reach. In the attempt to swallow water it may be thrown out through the nostrils. A slight annoyance renders the animal furious and he attacks with ferocity any animal or person. The attacks of fury become more and more frequent. The pulse may reach 100 to the minute, and respiration is difficult. Paralysis commences in the limbs and soon becomes general. Death occurs from asphyxiation in from three to six days.

RABIES OF THE COW The symptoms in these animals are much the same as those just described. There is often an intense irritation at the site of the wound. Changes in the appetite occur and rumination stops. In about twenty-four hours after the appearance of the first symptoms, fury becomes manifest; there is bellowing, and hallucinations, which are evident from the aspect of the countenance as well as the actions. Swallowing becomes difficult, saliva flows in abundance from the mouth. Waving the hand or a stick at the animal is sufficient to make it attack. In the intervals of fury the animal is somnolent, dull. Death usually occurs by paralysis, starting often in the limb which was bitten. The animal soon becomes prostrated and dies on the fifth or sixth day. In these animals, as in others, the paralytic or "dumb" form is seen also.

The symptoms as seen in goats, deer and sheep do not differ materially from those already described.

A symptom more or less common to all animals is the irritation about the site of the inoculation wound, this being often the earliest symptom which attracts attention.

Rabies of Birds. The disease in birds is apt to be of the paralytic type, and its duration is more chronic than in any animal, lasting from fourteen days to several weeks, and occasionally ending in recovery. The crow, falcon and old pigeons are refractory to the disease, while chickens, geese, owls and young pigeons contract it readily. The period of incubation in geese and owls is about fourteen days, while for the chicken it may reach forty days. The degree of virulence of the virus with which the inoculation is made seems to have but little effect on the rapidity of incubation. The blood serum and brain matter of birds which resist the disease destroy the virus. The changes in the central nervous system are the same as those which have been found in man and in the domestic animals, and are especially marked when the disease is slow in its progress.

Appearances After Death. There is no change in animals which have died of rabies which can be considered specific of the disease. The cadaver is apt to be emaciated and becomes putrid rapidly. The blood is dark and thick; the brain and its membranes may be congested, even show slight hemorrhages, and the respiratory and digestive tracts show a catarrhal condition, with slight hemorrhages. Perhaps the most constant feature is the presence of foreign bodies such as wood, straw, hair, etc., in the stomach and the absence of food, this condition having been found in 90 per cent. of 200 cases in dogs examined by Axe.

The absence of changes, which may be considered as belonging specifically to rabies, is no doubt due many of the erroneous ideas which have been held concerning the disease.

Until recently, the only way of making a certain diagnosis after death, was by the inoculation of other animals with a portion of the brain or spinal cord of the dog. For this purpose the rabbit has been usually selected, as being one of the most susceptible of all animals to the disease. Injections into the muscular tissues of any part of the animal with the virus of rabies, will almost certainly produce the disease, but it is more quickly produced by inoculation beneath the membranes of the brain. For this purpose a small button of bone is taken from the skull, just large enough to admit the insertion of a hypodermic needle, and three or four drops of a suspension of the brain, made by rubbing with water in a mortar, is introduced. The wound in the skin is washed with carbolic acid and then sealed with collodion and cotton. The rabbit shows no inconvenience from the operation whatever, and will eat and play within a minute after its completion. If the operation is done in a cleanly manner, and the material is fresh and has not undergone decomposition at all, no ill effects are observed until symptoms of hydrophobia present themselves. This seldom occurs in less than three weeks, and may not take place until sixty days have passed. The symptoms as seen in the rabbit are well defined and entirely diagnostic. The form of the disease in rabbits after such inoculation is almost always the paralytic, though at times the animals become furious, biting a stick or any other object within their reach. Before the death of the animal its symptoms are carefully noted, and after its death the brain and organs are examined, and cultures made from the blood and all organs, with the object of making sure that the animal died of hydrophobia, and not of some accidental infection, in which case the germ producing that infection would be manifest in the cultures. When the inoculated animal dies before the fourteenth or fifteenth day we may be reasonably sure that it has not died of rabies, but as a result of the operation. This examination can be carried out properly only by those who have had special training, and should not be attempted by others.

MICROSCOPIC EXAMINATION. In a disease marked by such striking symptoms referable to the nervous system, it is natural to expect that changes would be found in the central nervous system sufficient to account for the production of symptoms. As well stated by Babés, "this disease so clearly characterized by a train of symptoms, constant in their character, ought also to present characteristic lesions in the nervous centers, and especially in the ganglia which preside over the production of symptoms." Numerous studies have been undertaken by workers in various parts of the world, with the object of discovering some change in the nervous system which could be considered as belonging especially to rabies, but while changes were found, none of them could be considered as specific.

RECENT ADVANCES IN OUR KNOWLEDGE. During the year 1900, the discovery of changes distinctive of rabies was announced by Van Gehucten and Nélis. These changes are found in the peripheral ganglia of the cerebro-spinal and sympathetic systems, and are especially marked in the plexiform ganglion of the pneumogastric nerve and the gasserian ganglion. Normally, these ganglia are

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composed of a supporting tissue holding in its meshes the nerve cells, each one of which is enclosed in a capsule, made up of a single layer of endothelial cells. (Fig. 1.) The action of the rabic virus seems to exercise its effect on these cells particularly, bringing about an abundant multiplication of the cells forming this capsule, leading finally to the complete destruction of the normal ganglion cell and leaving in its place a collection of round cells. (Fig. 2.) Ordinarily a considerable number of ganglion cells will be found which have undergone only a slight change, but under certain condi-

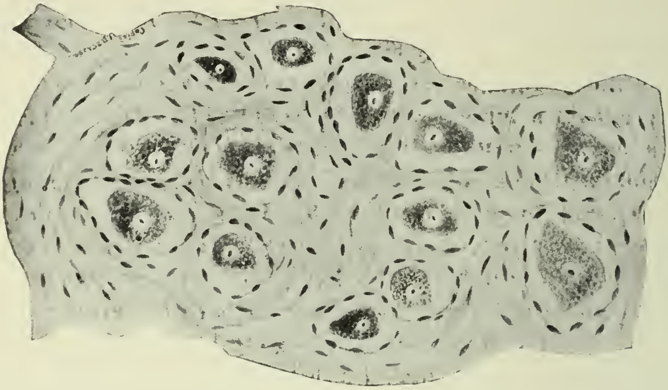


Fig. 1. Normal Ganglion. (Reproduced by Crocq, Journal de Neurologie, Vol. V., No. 13).

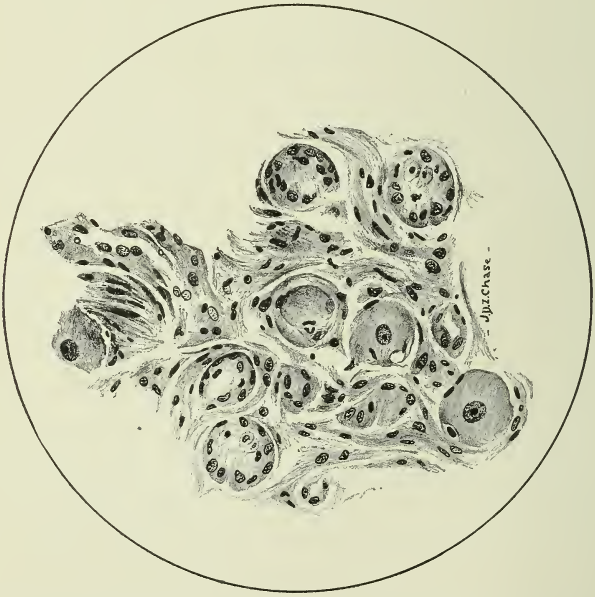


Fig. 2. Plexiform Ganglion of Rabbit, dead of rabies produced by sub-dural inoculation. The capsules are filled, or partially filled by the new formed cells.

tions the process is so widespread that all the ganglion cells are destroyed. The intensity of these changes varies in different animals; they are perhaps most pronounced in the dog, less marked in man and still less in the rabbit.

Much of the value of these findings consists in their affording a quick and sure means of making a diagnosis. It is possible to complete the examination within six hours after the death of the animal, and under ordinary circumstances a positive opinion can be given in from twenty-four to thirty-six hours. It is important that the animal should be allowed to die, and not be killed prematurely, as where the disease is not permitted to run its full course ending in death, the changes may be absent or only slightly developed.

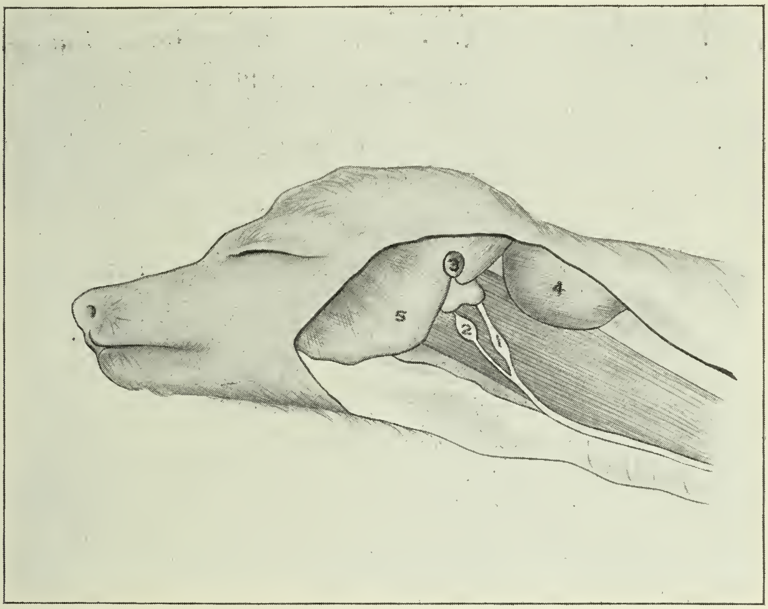


Fig. 3. Dissection of the upper neck of dog, showing the Plexiform Ganglion of the Pneumogastric nerve, in which the changes are usually sought for 1. Plexiform Ganglion. 2. Cervical Ganglion. 3. External auditory meatus. 4. Atlas. 5. Inferior Maxilla. (After Valee-Diagrammatic).

The ganglion on the pneumogastric nerve is selected by preference and should be removed as soon as possible after the death of the animal. (Fig. 3.) It is put into absolute alcohol, or in 10 per cent. formalin solution. If put into absolute alcohol it should be removed to a fresh portion of alcohol at the end of six hours, in which it remains for six hours, when it may be transferred for one hour to a mixture of absolute alcohol and chloroform, and then put for one hour in pure chloroform, then one hour in a mixture of chloroform and paraffin, and lastly imbedded in pure paraffin. If formalin is used for fixing, the ganglion should be removed at the end of six or eight hours, put for six hours more in 95 per cent. alcohol, and then into absolute alcohol for six hours, after which it may be fixed to blocks for cutting, by mucilage of gum arabic, or else imbedded in collodion. The characteristic changes in the capsule are brought out best by the use of hematoxylin, or hemalum, and eosin. The method of Nissl gives good results also, but as it requires some special technical knowledge to be efficiently carried out, the former is recommended for its simplicity and ease of execution. This method has stood the test in Europe and America for nearly two years, and although a large number of animals having different diseases have been examined with the object of determining whether or not these changes may occur in other conditions, they have never been found.

At the laboratory of the State Live Stock Sanitary Board, which was the first in this country to take up this method, fifty-two cases have been examined since May, 1900, without a single failure. These cases have occurred in mankind, dogs, cows, cats and rabbits, and the characteristic changes have been found in each of these species. We have not had an opportunity of examining horses, sheep or swine. In this laboratory it has replaced the slower and less certain method of inoculation almost entirely. Inoculations are now practised only in those cases in which the material is sent in such condition that the microscopic examinations is impossible.

Treatment. When once the symptoms of rabies have manifested themselves, treatment is of little avail, either in man or in animals. Except for the purpose of making a sure diagnosis, animals may be destroyed at once. In man, the only treatment possible is directed to the control of symptoms, such as the spasms, and the relief of suffering. All that can be done is to give anti-spasmodics, such as chloral, bromides and morphine in large doses, or else resort to the inhalation of chloroform. It is better not to waste time by giving the milder anti-spasmodics, but to begin at once with the strong ones like morphine and chloroform, which should always be administered under the direction of a physician.

In birds and animals a few cases of recovery have been observed even after inoculation with the virus in good quantity. In man the disease is uniformly fatal, consequently our measures to be successful must be directed to preventing the development of the disease after inoculation by the bite of a rabid animal.

Pasteur Method. Treatment must, therefore, be preventive and not curative. The only method which is worth while mentioning is that of Pasteur, by which an immunity is produced by the subcutaneous injection of the virus of rabies in an attenuated form, beginning with the mildest virus and going gradually up to one which possesses full virulence. This attenuation of the virus is brought about by drying at a fixed temperature, and the action of the atmosphere. Depending upon the length of time the virus is exposed to these influences, we can obtain any degree of virulence desired, the loss of virulence under fixed conditions being quite uniform.

The disease as seen in dogs infected naturally was called by Pasteur "street rabies," and the virus from such animals is known as the "virus of street rabies." Such virus will produce the disease in rabbits by intra-cranial inoculation in from three to four weeks as a rule. By inoculating rabbits in series, one from the other, we obtain a reduction in the period of incubation so that after about 100 passages, rabbits will die on the sixth or seventh day after inoculation with great certainty. Beyond this point no increase of virulence can be obtained, therefore, to this virus the name of "fixed" was given. It is with this "fixed" virus that all of our methods of vaccination are carried out.

Preparation of Vaccine. The spinal cord of a rabbit which has died after inoculation with this "fixed" virus is removed with the greatest precaution to prevent contamination. It is then cut into three portions, of equal length, and suspended by a silk thread in a large bottle containing a layer of caustic potash at the bottom. The bottle has an opening near the bottom as well as at the top, both of which are plugged with cotton, to allow a free passage of atmospheric air. These are kept in a dark room at a carefully maintained temperature of 23 degrees C. Under these conditions the cords lose their virulence entirely in about fifteen days. Those kept for fourteen days have a very slight degree of virulence, and furnish our weakest virus with which the vaccination is begun. On succeeding days cords which have been dried for thirteen, twelve, eleven, etc., days, are used, until one which has unimpaired virulence may be injected with perfect safety. The method was tried at first on animals with perfect success, and since 1885 has been applied to persons bitten by rabid animals. The treatment is varied slightly according to the extent of the bites and their location. The simplest form requires fifteen days, the next eighteen days, while what is called the "intensive" treatment, employed where the bites are about the face, and in portions of the body rich in nerve supply, requires twenty-one days. The one most commonly used is given below:

TREATMENT MOST COMMONLY USED—18 DAYS.

Day of Treatment.	Age of the Cord.	Quantity Injected.
1,	14 days,	3 cubic centimetres.
	13 days,	3 cubic centimetres.
2,	12 days,	3 cubic centimetres.
	11 days,	3 cubic centimetres.
3,	10 days,	3 cubic centimetres.
	9 days,	3 cubic centimetres.
4,	8 days,	3 cubic centimetres.
	7 days,	3 cubic centimetres.
5,	6 days,	2 cubic centimetres.
	6 days,	2 cubic centimetres.
6,	5 days,	2 cubic centimetres.
7,	5 days,	2 cubic centimetres.
8,	4 days,	2 cubic centimetres.
9,	3 days,	1 cubic centimetre.
10,	5 days,	2 cubic centimetres.
11,	5 days,	2 cubic centimetres.
12,	4 days,	2 cubic centimetres.
13,	4 days,	2 cubic centimetres.
14,	3 days,	2 cubic centimetres.
15,	3 days,	2 cubic centimetres.
16,	5 days,	2 cubic centimetres.
17,	4 days,	2 cubic centimetres.
18,	3 days,	2 cubic centimetres.

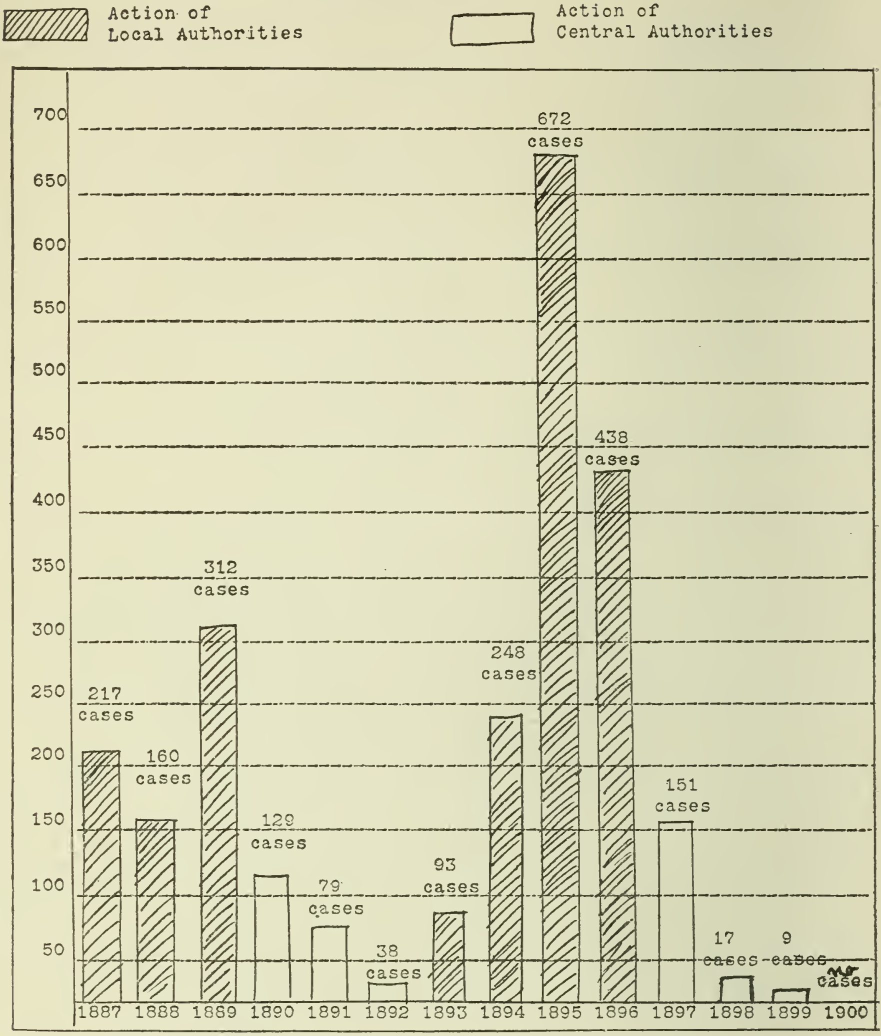
RESULTS OF TREATMENT. Since the commencement of the Pasteur Preventive Treatment, some 55,000 persons have been inoculated, the treatment now being administered in twenty-five laboratories in different parts of the world. The total average mortality at all these laboratories is about 0.77 of 1 per cent. This includes a number of people who have been bitten by wolves, the bites of these animals being especially fatal, the mortality reaching as high as 80 per cent. in every 100 bitten. At the parent institute in Paris from 1886 to 1899, inclusive, 23,245 cases have been treated, of whom 103, or 0.44 of 1 per cent. have died. The mortality during the first year was 0.94 of 1 per cent., and has steadily gone down until during 1899 it was 0.25 of 1 per cent., the lessened mortality being due to some extent at least to the smaller number of persons bitten by wolves who have been treated there in late years, owing to the fact that there have been laboratories instituted in other pars of Europe nearer to the regions where wolves abound.

The value of the preventive treatment is well brought out by statistics. In Hungary, from April 15, 1890, to December 31, 1890, 5,899 persons were bitten, of whom 4,914 were inoculated, with a mortality of 1.2 per cent., while the mortality among those who did not take the treatment reached 14.94 per cent. The treatment is absolutely free from danger, and has no ill effects whatever except soreness at the point where the injections are made. Persons undergoing it are not confined to the house, but are able to go backward and forward from their homes to the institution.

Application to Animals. A large number of experiments have proved that the Pasteur treatment is applicable to animals also, though the shorter period of incubation which is the rule in many of them, makes it less sure, and the expense attending it has prevented its general use. At the Veterinary Department of the University of Pennsylvania it has been successfully applied in several instances, the "vaccine" having been furnished by the New York City Department of Health.

PREVENTION AND ERADICATION OF THE DISEASE. As regards both man and animals the only rational procedure is to attempt the eradication of the disease, and since it is kept alive by the canine race our measures must be directed to the control of dogs. Among the respective measures which have been advocated may be mentioned a high tax, muzzling and the leash. During outbreaks which excite terror in a community we see not unfrequently the enactment of the most extreme measures, such as the destruction of all dogs, which is totally unnecessary. The results obtained by strict enforcement of muzzlings seem to justify its recommendation. To this measure is ascribed the eradication of the disease from Berlin in the year 1854-1855, and the recent results obtained in Great Britain are most striking. The official reports of Great Britain show that in 1887 there were 217 cases of rabies; 1888, 160; 1889, 312. Owing to the alarm caused by this increase, muzzling was adopted, with the result that in 1890, 129 cases were seen; in 1891, 79 cases, and 1892, 38 cases. There was much opposition to the enforcement of the muzzling ordinance and it was relaxed, with the result that in 1893 the number of cases rose to 93; in 1894, to 248 cases, and in 1895, 672 cases were seen. Owing to the alarm muzzling was again enforced, resulting in a great reduction in the number of cases, to 438 in 1896, 151 in 1897, 17 in 1898, and 9 in 1899. From November, 1899, to January 1, 1901, not a single case of rabies has been reported in England or Scotland, according to official statistics just issued for the year 1900.

Table Showing Effect of Enforcement of Muzzling by Central Authorities in England 1887-1900.



Professor MacFadyean says in his report: It appears probable that the past year (1900) will remain memorable as the one in which rabies was eradicated from Great Britain. As a matter of fact, no case of the disease was detected in England or Scotland during the past twelve months, and the only cases reported during the year were in Wales. The total number of dogs attacked was six, but five other animals were destroyed in consequence of having been bitten by rabid dogs. No case of the disease has been detected in dogs since the second week of October last."

Precautions to be Taken by Person Bitten. In the event of a bite by an animal supposed to be mad the wound should be cauterized as soon as possible with fuming nitric acid. This should be thoroughly applied to all parts of the wound, making sure that there are no pockets or recesses which escape the action of the acid. If such cauterization is carried out within twenty-four hours of the reception of the wound, the danger is very much lessened, and if done within a few hours the protection is absolute. In the absence of fuming nitric acid the hot iron or the thermo-cautery, or even strong antiseptics may be used, but experiments have shown that nitric acid is the most efficient. The invariable rule should be: *Cauterize as soon as possible, and in the meantime do everything to get the virus out of the wound*, by washing in an abundance of water, enlarging the wound and encouraging free bleeding by cupping or the application of ligatures around the limb above the site of injury. Osler advises that the wound be kept open for five to six weeks.

The animal which inflicted the wound *should in no case be killed but should be captured, if possible, and confined for observation.* In this way it is often possible to determine positively within a day or two whether the animal was really rabid, and much anxiety spared the bitten person. As soon as the animal dies the whole head should be cut off close to the shoulders, packed in ice and sent to the nearest laboratory for examination. In the State of Pennsylvania, the Laboratory of the State Live Stock Sanitary Board undertakes this work free of expense, and in the majority of cases a positive opinion can be given in twenty-four hours after the receipt of the head. Where the animal has been killed, either by intention or accident, a positive opinion cannot be given in many cases in less than from three to six weeks, as the result of inoculation must be waited for. The same is true where only a portion of the brain is sent, since the changes which indicate rabies that can be detected by the microscope are found only in the medulla oblongata, and in the ganglia found on some of the nerves. From these facts, the great importance of sending the whole head and neck will be seen.

DISPOSAL OF BODIES OF ANIMALS WHICH HAVE DIED OF RABIES. The flesh of animals which have died of rabies, or have been killed on account of it, is unfit for food. If possible, the carcass should be destroyed by burning, or be sent to a knacker's, where it is cooked in the process of utilizing it commercially. If this is not possible, it should be deeply buried under a layer of quick lime. The law of France allows the removal of the skin, and its sale after disinfection, which is done by immersing it in a 2 per cent. solution of sulphate of zinc, or in corrosive sublimate, two parts to 1,000.

DISINFECTION. All bedding used by an animal with rabies, and all remains of food, etc., should be destroyed by burning. Collars, chains, halters, blankets, feed-pans and other such articles should be well washed with a 5 per cent. solution of carbolic acid, and exposed to the sun for two or three days after. Every part of the kennel, room or stall should be washed with the same, and after drying receive a thick coat of whitewash. In the case of horses, cows and such animals, particular attention must be paid to the feed and water troughs, as the chief source of contagion is the saliva, and these articles are especially apt to be contaminated. In all cases it is best to leave the kennel or stall vacant for two weeks, and in the meantime expose them to the sun and air as freely as possible.

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COMMONWEALTH OF PENNSYLVANIA.

DEPARTMENT OF AGRICULTURE.

BULLETIN No. 81.

Concentrated Commercial Feeding-Stuffs in Pennsylvania.

BY

WM. FREAR, PH. D.

AN INVESTIGATION BY THE DEPARTMENT OF AGRICULTURE OF PENNSYLVANIA IN CO-OPERATION WITH THE PENNSYLVANIA STATE COLLEGE AGRICULTURAL EXPERIMENT STATION.

PUBLISHED BY DIRECTION OF THE SECRETARY.

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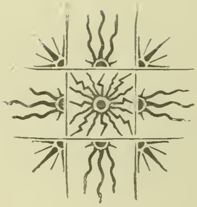

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PREFACE.

Harrisburg, Pa., September 1, 1901.

The following Bulletin, No. 81, giving the results of an investigation into the character of "Concentrated Commercial Feeding-Stuffs" sold in Pennsylvania, was undertaken in the summer of 1900 under an arrangement between this Department and the State Agricultural Experiment Station.

At the time at which the investigation was begun, Pennsylvania had no cattle food control law, but during the last winter the Legislature passed an act providing for the inspection of cattle foods in this State.

The necessity for such legislation is apparent, from the data given in this Bulletin, gathered from samples of foods found upon the markets. The examination shows that some brands are almost worthless and others are badly adulterated. The law provides for an examination of all cattle foods sold in Pennsylvania, and requires that each package shall be marked with "the number of net pounds of feeding stuff contained therein; the name, brand or trade mark under which the article is sold; the name and address of the manufacturer or importer, and a statement of the percentage it contains of crude fat and of crude protein. The term 'concentrated commercial feeding stuffs,' as used in this act, shall include linseed meals, cotton seed meals, gluten meals, maize feeds, starch feeds, sugar feeds, dried brewers' grains, malt sprouts, hominy foods, cerealine feeds, rice meals, ground beef or fish scraps, and all other materials of similar nature, but shall not include hays and straws, the grinding together of pure whole grains, nor the unmixed meals made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat or broom corn; neither shall it include wheat, rye, or buckwheat bran, or middlings not mixed with other substances, and sold separately as distinct articles of commerce. No foreign mineral substance, nor substance injurious to the health of domestic animals, shall be mixed with any feeding stuff sold, or offered, or exposed for sale in this State."

The law goes into effect on the 1st of October, 1901, and will, it is hoped, effectually prevent the adulteration of feeding stuffs that has been so largely practiced in the past.

JOHN HAMILTON,
Secretary of Agriculture.

COMMERCIAL FEEDING STUFFS IN PENNSYLVANIA.

The chemist in his examination of cattle foods, separates them into several principal groups of materials:

1. *Moisture.*
2. *Ash*, the mineral matter of the food that is left when it is burned.
3. *Protein*, the total nitrogenous material of the food, which is assumed to be entirely composed of substances like the white of egg (albumen) in their chemical and nutritive properties, and called *albuminoids* from this resemblance; but, in point of fact, in many foods, particularly the green and immature leaf and stalk crops and the root crops, a large part of the nitrogenous material is composed of crystallizable substances (non-albuminoids) of quite different nutritive value. The mature grain and stalk contain comparatively little of the non-albuminoids.
4. *Fiber*, the woody matter, forming the framework of plants.
5. *Nitrogen-free extract*, including starch, sugars, gums, plant acids, etc. This group with the fiber composes the carbohydrates of the food.
6. *Fats*, or more properly, the ether-extract. This is determined by extracting the dry food with ether, which takes out the fat with more or less of other materials; from the grain, little else; but from leaves, stalks, etc., relatively large quantities of coloring matters, waxes, etc.

Before any of these substances can be used, they must be dissolved by the digestive fluids of the mouth, stomach and intestines and taken up into the body. This process of solution and absorption is called *digestion.* The degree to which any of the above groups of food constituents is digested depends both upon the nature of the animal using the food, the nature of the individual substances of which the group happens to be made up in a given food, the mechanical condition in which it exists and the proportion which the group under consideration bears to the other groups of food substances present in the digestive tract at the same time. Thus, so-called "herbivorous" animals provided with a paunch, have greater power of digesting fiber than is possessed by animals with a single, small stomach like the hog; the tender fiber of young plants, is more digestible than the hard, ligneous fiber of old, woody plants; the proteids of clover and timothy seeds are really quite digestible, but escape digestion in a horse's stomach, because the hard seed-coats of these small seeds fail to be broken by the animal's teeth and almost entirely prevent access of the digestive fluids to the proteids; and finally, the digestibility of protein is decreased when large quantities of carbohydrates are present in a ration. The percentage of a given group of materials that is removed from a given food by digestion is termed its *percentage of digestibility*, or sometimes, its *coefficient of digestion.*

The more important nutritive uses of the digested parts of these several food constituents may be briefly noted:

The ash materials supply the mineral salts of the bone, blood, muscle and other animal tissues.

The carbohydrates (fiber and nitrogen-free extract) and fat serve, when burned in the body, to maintain its temperature and supply of energy. For this purpose, the fat is 2.25 times as valuable as the carbohydrates. Both of these groups are also capable of forming body-fat. The protein alone is able to supply the nitrogenous substances forming the organic matter of bone, blood, muscle, nerve, skin, wool, milk-curd and egg-albumen.

To permit a more perfect distinction of food values in the commercial feeding stuffs, the average composition of a number of the more common cattle food products of a Pennsylvania farm is given below:

Composition and Nutritive Ratios of Farm Feeds, Pennsylvania.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Nutritive ratios.
Green Forage:							
Pasture grass,	73.37	2.46	5.82	4.85	11.81	1.69	1: 3.7
Timothy in blossom,	65.10	2.00	2.80	12.60	21.50	1.30	1:14.4
Clover in bloom,	72.70	2.20	4.30	6.50	13.40	0.90	1: 5.0
Hungarian grass in bloom,	62.70	2.16	3.22	10.78	20.08	1.06	1:11.6
Soiling rye,	76.60	1.80	2.60	11.60	6.80	0.60	1: 5.7
Soiling oats,	62.20	2.50	3.40	11.20	19.30	1.40	1: 9.1
Soiling corn, kernels glazed,	73.40	1.50	2.00	6.70	15.50	0.90	1:15.1
Corn silage,	79.10	1.40	1.70	6.00	11.10	0.80	1:16.5
Cured Forage:							
Corn stover,	42.20	2.70	4.50	14.30	34.70	1.60	1:17.4
Timothy hay,	14.20	4.40	5.20	28.10	44.60	3.00	1:16.2
Red clover,	20.90	6.60	11.50	24.70	33.00	3.30	1: 6.0
Hungarian grass,	7.70	6.00	7.50	27.70	49.00	2.10	....
Wheat straw,	4.60	9.20	3.40	38.10	43.40	1.30	1:65.5
Rye straw,	7.10	3.20	3.00	38.90	46.60	1.20	1:69.2
Oat straw,	9.20	5.10	4.00	37.00	42.40	2.30	1:32.8
Buckwheat haulm,	9.90	5.50	5.20	43.00	35.10	1.30	*
Roots:							
Potatoes,	78.90	1.00	2.10	0.60	17.30	0.10	1:17.4
Mangel wurzels,	90.90	1.10	1.40	0.90	5.50	0.20	1: 4.9
Sugar beets,	86.50	0.90	1.80	0.90	9.80	0.10	1: 6.8
Turnips,	90.50	0.80	1.10	1.20	6.20	0.20	1: 7.7
Rutabagas,	88.60	1.20	1.20	1.30	7.50	0.20	1: 8 5
Grain:							
Dent corn, kernel,	10.60	1.50	10.30	2.20	70.40	5.00	1:12.1
Oats,	11.00	3.00	11.80	9.50	59.70	5.00	1: 5.8
Rye,	11.60	1.90	10.60	1.70	72.50	1.70	1:11.0
Barley,	10.90	2.40	12.40	2.70	69.80	1.80	1: 8.0
Wheat, winter,	10.50	1.80	11.80	1.80	72.00	2.10	1: 9.9
Buckwheat,	12.60	2.00	10.00	8.70	64.50	2.20	1: 7.0

* No data on record.

By the term *nutritive ratio*, is meant the proportion which the protein bear to the starch equivalent of the nitrogen-free extract, fiber and fat in the digestible portion of any food-stuff, the protein being taken as 1. This starch equivalent is calculated by the addition of the quantities of digestible nitrogen-free extract and fiber to two and one-fourth times the quantity of digestible fat; this increase in the case of the fat being due to its exceptional heat producing power, to which reference has already been made.

The results of many decades of farm experience and of recent accurate scientific investigations show that the value of a ration to produce a specific result, such as the development of the young animal, the production of lean meat, or of fat, the enlarged or continued flow of milk, or, especially, working capacity, depends very materially upon the nutritive ratio of the food consumed.

As illustrations of the ratios found in foods that experience has proven to possess especial value for the several purposes above mentioned, the following may be cited:

1. Oxen at rest in the stall,	1:12.0
2. Fattening oxen, main period,	1:5.5
3. Fattening swine, main period,	1:6.0
4. Growing cattle, 2 to 3 months old,	1:4.7
5. Growing cattle, 18 to 24 months old,	1:8.0
6. Milk cows,	1:5.4
7. Wool sheep, finer breeds,	1:8.0
8. Horses, moderately worked,	1:7.0
9. Horses, heavily worked,	1:5.5

Comparison of these ratios with those of the feeding stuffs of domestic production at once shows that so long as pasture is abundant, growing animals, milk cows and work horses can readily secure the food fitted for their use. In the earlier days of American agriculture, little more than mere maintenance of farm animals was attempted during the winter months. For this purpose, the hay of timothy and other true grasses, corn stover and oat straw as roughage and corn and the more costly oats as grains, served excellently well; the latter grain being chiefly reserved, however, for the feeding of driving horses and possibly the family cow. The problem of securing a fitting food is much more difficult, however, in these days of intensive farming with restricted pasturage areas; of winter dairying with the consequent winter feeding of the calves that are reserved for raising; and of increased demand for lean as contrasted with fat meat.

The use of the process of ensilage in connection with intensive farming and winter dairying has ensured a supply of succulent food with valuable dietetic results, but, as it is usually conducted, has not materially improved the nutritive ratio of the average ration. The employment, also, of immature soiling crops in the spring and early summer, at a time when pastures are not yet ready to receive the herds and flocks, has reduced somewhat the period during which the wide-ratio roughage must chiefly be relied upon. The substitution of roots for any large portion of the ration is not esteemed practicable with the small animals preferred in America for dairy purposes, because of the bulky nature of the food, as well as because of its comparatively high cost. The use of clover and similar legumes for the purpose of securing narrower nutritive ratios in the rations of working, growing and milk-producing animals has very largely increased, with highly advantageous results in quality and yield of product; but a limit is speedily reached in practice beyond which the substitution of clover for corn stover or corn silage and for a portion of the grain food is not advantageous to the animal and is not economical of the entire product of any known general system of farming in America, where the corn crop is so important a part of every widely accepted rotation.

Consequently, there has arisen, within the last few decades, an increasing demand for concentrated feed stuffs—that is, such as are of relatively little bulk and are, in very large measure, digestible—more especially, for such as are rich in protein. To supply this demand, a great trade in such materials has developed; the centralization of the milling operations of the Northwest has resulted in the formation of large stocks of wheat by-products for which the grain farms of the West offer no market, but which move readily eastward to the points of greater demand. The introduction of new methods of manufacture has made possible the utilization for distant markets of the by-products from the manufacture of beer and spirituous liquors, of starch, glucose and cereal breakfast foods, so that to-day the farmer has offered for his use not only large quantities of concentrated feed-stuffs, but materials of great variety of source, composition and dietetic value.

It is not the purpose of this bulletin to discuss the nutritive and dietetic values of the several materials, but rather to briefly consider their nature and the composition which they exhibit in the Pennsylvania markets; especially to determine the variations appearing in the amounts of important constituents and to compare them with those observed in New York and New England. For New York, New Jersey, Maine, Massachusetts, Rhode Island and Connecticut have required that dealers in such materials shall stamp upon the packages containing them a guarantee of composition, analogous to that which most States require from dealers in fertilizers, and have provided for a control analysis of the feeding stuffs.

The samples whose analyses are recorded below were taken by agents appointed by the State Department of Agriculture, and the analytical work has been performed under the direction of the writer, by Messrs. M. S. McDowell and M. H. Pingree, Assistant Chemists of the Experiment Station, in accordance with arrangements made between the Secretary of Agriculture and the Advisory Committee for the Experiment Station. For the purposes of this examination, determinations of the protein and fat were all that were deemed necessary in most cases. These determinations were made by the official methods, except that the feeding-stuffs were not dried in a current of hydrogen.

The fact that the analytical examination has been confined in most instances to these two indicative constituents, must not be made a ground for disregarding in the selection of market feeding-stuffs, the nutritive value of the fiber and other carbohydrates, nor further must it be assumed that concentrated feeds, though different in the quantities of carbohydrates they contain, are essentially alike as regards the nutritive quality of these constituents. In general, starch and sugar are more highly digestible than fiber, gums and related materials and probably have, for equal quantities of digested substance, a higher nutritive effect. The following table compiled by Jordan and Jenter,* well presents the more striking differences:

Carbohydrate Relations in Dry Matter of Several Feeding Stuffs.

	Sugars and starch.	Total nitrogen-free extract.	Sugars and starch in nitrogen-free extract.	Digestibility of the nitrogen-free extract.
Wheat, entire grain, Stone,	57.9	77.7	74.6	....
Wheat, entire grain, Wiley,	72.5	78.5	92.4	....
Maize, entire grain, Stone,	66.0	78.0	84.6	93
Oats, entire grain, Wiley,	50.9	66.3	76.8	83
Mixture, maize and oats, equal parts,	58.4	72.1	81.0	....
The Gluten Products:				
Gluten meal,	38.2	49.8	76.7	93
Buffalo gluten feed,	27.3	58.3	46.8	84
Davenport gluten feed,	29.8	60.9	48.9	....
Diamond gluten feed,	31.6	61.6	51.3	....
Joliet gluten feed,	34.0	66.0	51.5	....
Peoria gluten feed,	28.9	59.8	48.3	90
The Oil Meals:				
Cotton-seed meal,	16.0	27.9	57.4	50
Linseed meal, old process,	13.2	29.2	33.7	78
Linseed meal, new process,	20.8	40.8	51.0	84
Malt sprouts,	23.1	49.6	46.6	69
Buckwheat middlings,	27.3	48.3	56.5	....
Wheat bran,	23.6	60.5	39.	69
Wheat middlings,	38.8	64.2	60.4	85
Hominy feed,	50.1	72.7	68.9	....
H. O. dairy feed,	34.6	60.4	57.3	....
Oat feed,	29.4	61.5	47.8	60
Victor feed,	43.0	70.3	61.2	....
Chop feeds,	47.5	73.5	64.6	....
X oat feed,	16.1	57.9	27.8	....

In the presentation of the results of their work, the Massachusetts and New York Stations have followed a classification of feeding-stuffs based upon their composition. The modified form adopted in New York is as follows:

Class I. Thirty to 45 per cent. protein and 50 to 60 per cent. carbohydrates, including cotton-seed meal, linseed meal and the gluten meals, such as the Chicago, King, Cream and the Hammond.

Class II. Twenty to 30 per cent. protein and 60 to 70 per cent. of carbohydrates, including gluten feeds, such as the Buffalo, Golden, Diamond, Davenport, Climax and Standard, as now made, Atlas meal, dried brewers' grains, malt sprouts, buckwheat middlings and peas and beans.

Class III. Fourteen to 20 per cent. of protein and 70 to 75 per cent. of carbohydrates, including brans and middlings from wheat and rye, certain so-called mixed feeds of a proprietary character, these being in part oat feeds fortified with some more highly nitrogenous material.

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*Bulletin No. 166, N. Y. Agricultural Experiment Station, Geneva, p. 262.

Class IV. Eight to 14 per cent. of protein and 75 to 85 per cent. of carbohydrates, including barley, corn, oats, rye, wheat, cerealine, hominy and oat feeds, corn and oat chops, corn bran, corn germ feed and chop feed in general.

For the purpose of this bulletin it is, however, preferred to discuss these products in relation to the raw materials from which they are severally derived.

COTTON-SEED MEAL.

This is manufactured from the seed of the cotton-plant. The seed is tufted by a thick coat of lint, which is exposed, as the plant ripens, by the opening of the boll or pod. The lint which forms the cotton of commerce is removed from the seed by the operation of ginning, although a considerable quantity of short lint still clings to the seed coat. The proportion of seed in upland cotton* is about 2 to 2.2 pounds for each pound of lint, in sea-island cotton,† 2 to 2.5 pounds. The supply of this material is therefore very abundant. The fuzzy seed from the ginning process is then subjected to a rough milling process for the removal of the black hull from the oval seed. The hull is further worked to secure the small amount of lintel adhering. The decorticated seed—that is, that from which the hull has been removed—is then cooked, placed in jute sacks and subjected to heavy pressure in powerful hydraulic presses, whereby a portion of the oil is expressed. The press cakes, the "cotton-seed cake" of commerce, are afterward fine ground, yielding the cotton-seed meal. The average theoretical yield, as compared with the average milling product, is as follows:‡

	Theory, per cent.	Mill product, per cent.
Oil,	20.00	12.5
Meal,	30.00	37.5
Hulls,	40.00	48.9
Lintel,	10.00	1.1
	100.00	100.00

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* McBryde, Bulletin Tenn. Agr. Exp. Sta., Vol. IV, No. 5, pp. 127 and 129.

† Shiver, Bulletin, S. C., Agr. Exp. Sta., No. 47, p. 34.

‡ Statistics of X Census: Quoted in Bulletin Tenn. Agr. Exp. Sta., IV, No. 5, pp. 128-9.

These figures clearly show that fully 37.5 per cent. of the seed-oil remains in the press-cake and that the recovery of the lintel from the hull is very imperfect, being barely one-ninth of the amount present.

The relative composition of the undecorticated seed, the hull and the cotton-seed meal are as follows:*

	Seed, per cent.	Hull. per cent.	Meal, per cent.
Moisture,	7.71	11.30	7.47
Composition of dry matter:			
Ash,	3.40	3.30	7.60
Protein,	16.81	5.19	51.12
Fiber,	28.27	43.85	4.90
Nitrogen-free extract,	31.70	45.31	26.37
Fat,	19.82	2.35	10.01
	100.00	100.00	100.00

Hand-separated hulls contain only half as much protein and one-fourth as much oil. The milling operation results in a tearing away of a portion of the true kernel with the hull.

Good cotton-seed meal is yellow in color with a greenish tinge and possesses a pleasant nutty odor. On aging, it darkens, especially under conditions rendering it rancid or musty. Dark color indicates a possible admixture of black cotton-seed hulls, but not all dark colored samples are thus adulterated. Another impurity reported is an admixture of wastes from rice mills.

At a recent convention in New Orleans, the cotton-seed oil producers adopted the following rules:

"17. A ton of cotton-seed meal is 2,000 pounds, unless otherwise stated. A sack of cotton-seed meal is 100 pounds gross weight.

"Cotton-seed meal shall be classed and graded as follows:

"18. Choice. Must be the product from choice cotton-seed cake when finely ground, must be perfectly sound, sweet and light yellow color (canary), free from excess of lint and hulls. Analysis must contain at least 8 per cent. of ammonia.

"19. Prime. Must be made from prime cake, finely ground, of sweet odor, reasonably bright in color, yellow, not brown, or reddish, and free from excess of lint or hulls and by analysis must contain at least 8 per cent. of ammonia.

"20. Off. Any cotton-seed meal which is distinctly deficient in any of the requirements of prime quality, either in color, odor, texture or analysis, or all."

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* Bulletin Tenn. Agr. Exp. Sta., IV, No. 5, p. 144.

The following samples of cotton-seed meal were taken in Pennsylvania, this season, by Department agents:

No.	Name of Brand.	Manufacturer.	Dealer.	Price per ton.
147	Cotton-seed meal, ...	American Oil Co., N. Y. City,	Snyder Bros., Dalton Pa., ...	$26 00
32	Cotton-seed meal, ...	E. B. Williams & Co., Memphis, Tenn.	J P. Sandt, Easton, Pa., ...	30 00
125	Cotton-seed meal, ...	E. B. Williams & Co., Memphis, Tenn.	C. H. Sears, Clark's Summit, Pa., ...	27 00
209	Cotton-seed meal, ...	E. B. Williams & Co., Memphis, Tenn.	Wm. Fisher, ...	27 00
93	Cotton-seed meal, ...	....	J. Watson Craft, Ambler, Pa..	30 00
106	Cotton-seed meal, ...	....	Maryland Grange Agency, Balto., Md., ...	26 00
110*	Cotton-seed meal, ...	....	Morris Briggs, Woodburn, ...	27 00
111	Cotton-seed meal, ...	....	Trenton Milling Co., Morrisville, ...	27 00

* Musty, having become damp in the warehouse.

Their percentage, composition and other data for comparison are given below:

Number.	Moisture.	Protein.	Fat.	Remarks.
147, ...	6.41	42.50	12.25	
32, ...	6.76	46.69	9.28	
125, ...	7.62	45.25	9.82	
209, ...	7.34	44.69	10.06	
93, ...	8.88	43.69	8.77	
106, ...	7.09	44.50	9.89	
110, ...	7.11	43.31	11.26	
111, ...	6.91	44.56	9.48	
Average, ...	....	**44.40**	**10.10**	

Microscopic examination fails to reveal any foreign substances or any distinct excess of hulls; recent New York and Massachusetts examinations have detected such adulteration.

Comparison of these goods with those sold elsewhere may be made as follows:

	Number of analyses.	Protein, Per Cent.			Fat, Per Cent.		
		Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
Pennsylvania analyses, ...	8	46.09	42.50	44.40	12.25	8.77	10.10
New England analyses, 1898-99,.	205	52.6	40.3	45.4	17.0	6.5	11.2
New York analyses, 1898-99, ...	14	50.69	41.68	45.64	13.16	7.56	10.82

The average superiority of the goods sold in New York and New England in 1898-9, is shown by analyses reported in Bulletin No. 166 of the New York Experiment Station and summarized in Bulletin No. 130 of the Connecticut Agricultural Experiment Station.

LINSEED MEAL.

The seed of the flax plant is also rich in a peculiar oil, possessing in marked degree the power of absorbing oxygen from the air and thereby becoming hard and resinous—a property fitting it especially for use in making paints and oil varnish. The oil is contained, together with an abundance of protein, in the inner portion of the seed, the endosperm, or reserve food-supply for the developing embryo. The flat, shining seeds, dark brown in color, form, if mature, a slimy layer when left in contact with water. This is due to a transformation of the outer layers of the seed-coat into mucilage. One of the dark inner layers of the seed-coat carries considerable tannin. Owing, however, to the other constituents, the seed has a markedly soothing and slightly laxative effect. The composition of the entire seed is, according to Kuehn:*

	Per cent.
Water,	11.8
Ash,	3.4
Protein,	21.7
Fiber,	7.9
Nitrogen-free extract,	19.6
Fat or oil,	35.6
	100.0

There are two general processes for the separation of the oil from the crushed seed. The older process involves the pressure of the seed-meal by hydraulic presses. The operation is more complete when the seed-meal is first cooked, though the oil takes out more resin and coloring matter and, if too high a temperature is reached, the protein is modified and becomes somewhat less digestible. Meals from linseed cake prepared in this manner, are called "old process" meals and rarely, if ever, contain less than 3.5 per cent. of oil, the warm-pressing usually removing but 27 to 28 per cent. of the oil.

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*Pott, Ldw, Futtermittel, p. 442-3.

The "new process" is one of extraction by means of volatile solvents, such as carbon bisulfid or gasoline, more generally the former. The meal is placed in a large chamber and streams of the solvent are caused to slowly trickle through the mass, dissolving and extracting the oil, which is then recovered by evaporation of the solvent. The extracted meal is likewise freed from all traces of the solvent. Less than 3.5 per cent. of oil is commonly left in the meal, and sometimes less than 2 per cent. In general, the "new process" meal contains about 4.75 per cent. less oil than the "old process" meal and, correspondingly, 2.5 per cent. more protein. There is no ground for the quite frequent belief that there is an injurious chemical left in the meal treated by the extraction process.

The meal, as prepared by either of the above processes, is of a grayish-brown color and contains numerous dark-brown or black particles of the seed-coat.

The following samples were gathered by Department agents for examination:

"Old Process" Meals.

No.	Brand.	Manufacturer.	Dealer.	Price per ton.
229	Linseed meal, dry,	Armstrong & McKelvie, Pittsburg, Pa.	McClelland & Siple,	$35 00
236	Linseed meal, dry,	Armstrong & McKelvie, Pittsburg, Pa.	Byrne & Steele,	40 00
237	Linseed meal, dry,	Armstrong & McKelvie, Pittsburg, Pa.	Charles Friel,	40 00
76	Linseed meal,	Cleveland Linseed Meal Co., Cleveland, O.	Warner Bros., Grant, N. Y.,	33 00
264	Linseed meal,	Cleveland Linseed Meal Co., Cleveland, O.	L. Brant, Harrisburg, Pa.,	30 00
92	Cake meal,	J. Watson Craft, Ambler, Pa.	J. Watson Craft, Ambler, Pa.,	30 00
54	Linseed meal,	Gibson Bros., Philadelphia,	Mahlon C. Dietrich, Kempton, Pa.,	30 00
30	Linseed oil meal,	John T. Lewis & Bros. Co., Philadelphia.	J. P. Sandt, Easton, Pa.,	30 00
275	Linseed oil meal,	A. B. Orr, Linseed Oil Co., Pequea, O.	A. S. Somes, Halifax, Pa.,	30 00
246	Linseed meal,	Pain Bros. & Co., Milwaukee, Wis.	D. H. Beebe, Corry, Pa.,	26 90
72	Oil meal,	Thompson & Co., Allegheny, Pa.	King Bros., Union town, Pa.,	20 00
74	Oil meal,	Thompson Linseed Oil Co., Pittsburg, Pa.	G. L. Moore, Brownsville,	28 00
212	Linseed meal,	Thompson & Co., Allegheny, Pa.	C. Beckert, Pittsburg, Pa.,	30 00
217	Linseed meal, dry,	Thompson & Co., Allegheny, Pa.	W. H. Cleland, Pittsburg, Pa.,	35 00
234	Linseed meal, dry,	Thompson & Co., Allegheny, Pa.	Peter Bock, Pittsburg,	36 00
239	Linseed meal, dry,	Thompson & Co., Allegheny, Pa.	C. Kellner, Allegheny, Pa.,	30 00
95	Cake meal,	Toledo Mills, Toledo, O.,	W. H. Heebner, West Point, Pa.,	27 00
22	Oil meal,		Penn Traffic Co., Ltd., Johnstown, Pa.,	60 00
25	Oil or cotton-seed(?),		Widman & Sheeler, Johnstown, Pa.,	28 00
130	Linseed oil meal,		Snyder Bros., Dalton,	25 00
132	Linseed meal,		Weston Mill Co., Scranton, Pa.,	25 00
133	Linseed meal,		C. H. Sears, Clark's Summit, Pa.,	32 00
257	Oil meal,		F. L. Heath, Corry, Pa.,	30 00
259	Oil meal,		Bliss & Merrick, Cor-Pa.,	30 00
279	Linseed meal,		C. F. Dyer, Millersburg, Pa.,	30 00

“New Process” Meals.

No.	Brand.	Manufacturer.	Dealer.	Price per ton.
86	Linseed meal,	Cleveland Linseed Oil Co., Cleveland, O.	Simpson Bros., Norristown, Pa.,	$27 00
96	Linseed meal,		W. H. Heebner, West Point, Pa.,	25 00
83	Linseed meal,		Warren Mills Co., Warren, Pa.,	31 00

Analyses of Linseed Meals.

Number.		Moisture, per cent.	Protein, per cent.	Fat, per cent.
	‘Old Process” Meals.			
229		8.22	36.13	6.08
236		8.15	34.94	6.37
237		8.54	35.38	5.37
	Average, Armstrong & McKelvie,	(8.30)	(35.48)	(5.94)
76		9.74	32.94	6.61
264		8.43	31.00	6.10
	Average, Cleveland Linseed Oil Co.,	(9.13)	(31.97)	(6.36)
92		9.77	36.31	6.07
54		8.73	30.00	8.60
30		8.02	34.94	6.13
275		8.54	33.56	5.83
246		8.19	37.69	3.63
72		8.94	34.81	5.11
74		8.53	35.00	5.97
212		8.26	35.44	4.00
217		8.80	34.70	3.54
234		7.95	37.81	6.93
239		8.34	37.00	7.09
	Average, Thompson & Co.,	(8.47)	(35.79)	(5.44)
95		9.98	32.06	8.88
22		8.85	34.44	5.71
25		9.14	33.44	5.96
130		8.05	36.50	5.38
132		8.60	29.81	5.26
133		8.28	29.69	7.04
257		8.98	33.75	6.92
259		9.32	14.69	4.39
279		8.51	31.00	6.43
	Range,	7.95-9.98	14.69-37.81	3.54-8.88
	Average, excluding No. 259,	**8.64**	**34.10**	**6.04**
	Average,	**8.67**	**33.32**	**5.98**
	“New Process” Meals.			
86		10.41	34.00	2.19
96		10.31	34.13	2.92
	Average, Cleveland Linseed Oil Co.,	(10.36)	(34.07)	(2.56)
83		9.79	34.63	2.77
	Range,	9.79-10.41	34.06-34.63	2.19-2.92
	Average,	**10.17**	**34.25**	**2.63**

Microscopic examination of these samples shows the presence of no very marked quantity of foreign substances except in case of No. 259. This sample, while it shows the presence of the characteristic tissues of the flax-seed, contains a very large proportion of dark-brown hulls, containing long woody fibers, and of clear white masses not found in flax-seed but like those of buckwheat bran; also, there is a noticeable quantity of chaff. The very low proportion of nitrogen in this sample is such as the substitution of most of the linseed meal by buckwheat bran would render probable.

Excluding this adulterated article, a comparison of these Pennsylvania samples with goods of this kind in general may be made:

	Number of analyses.	Protein, Per Cent.			Fat, Per Cent.		
		Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
Old Process Meal:							
Pennsylvania samples, ...	24	37.81	29.69	34.10	8.88	3.54	6.04
New England analyses, 1898-9, ...	25	38.9	31.8	35.7	9.6	2.7	7.2
New York analyses, 1898-9,...	14	38.19	28.69	35.74	8.86	5.72	7.19
New Process Meal:							
Pennsylvania samples, ...	3	34.63	34.00	34.25	2.92	2.19	2.63
New England analyses, 1898-9, ...	31	42.2	39.6	38.2	3.5	1.8	2.4
New York analyses, 1898-9,..	5	37.56	35.19	36.14	4.79	2.91	3.57

Here too, a very marked superiority is observed in the case of the average goods sold in New York and New England.

WHEAT PRODUCTS.

In the course of the manufacture of flour from wheat, bran, middlings and a number of products sold under other names are separated and sold as cattle foods. A brief consideration of the composition of the winter and spring varieties of the grain, of the structure of the wheat berry and of the essential differences in its parts as they are separated by the two prevailing types of milling will be helpful in getting a clear notion of the nature of the several market feeds prepared from this grain.

Jenkins and Winton* several years ago summarized the analyses extant of American winter and spring varieties of wheat, with the following results:

	Winter wheat (262 analyses), per ct.	Spring wheat (13 analyses), per ct.
Moisture, ...	10.5	10.4
Ash, ...	1.8	1.9
Protein, ...	11.8	12.5
Fiber, ...	1.8	1.8
Nitrogen-free extract, ...	72.0	71.2
Fat, ...	2.1	2.2
	100.0	100.0

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* Bulletin No. 11, Office of Experiment Stations, U. S. Department of Agriculture.

Richardson* made 208 partial analyses of winter wheats from the Atlantic, Gulf and Middle States and of 33 samples of spring wheats from Minnesota, Dakota and Manitoba; the respective protein averages are 11.47 and 14.07 per cent. These data indicate an average of 13 to 13.5 per cent. of protein for spring wheats, an amount from one to two per cent. greater than that in winter wheats.

The structure of the wheat grain divides it into essentially four principal parts: 1. The epidermis or skin, including the hairs at the tip of the grain and three thin outer layers, weighing collectively about 3 pounds in 100 pounds of grain. 2. The color layer, composed of small cells containing two pigments, a yellowish and a red, according to whose relative predominance the color of the grain is "white," "amber" or "red." This forms 2 pounds in 100 pounds of grain. 3. The germ or embryo, located at the lower part of the grain and connected with a thin layer of tissue entirely enveloping (4) the *endosperm* or inner portion of the grain.

The outer layers are almost wholly composed of woody tissue. The germ is chiefly composed, on the other hand, of protein, oil and certain ash materials. The endosperm is not at all uniform in composition. At the center it is white and powdery, and is composed chiefly of starch enclosed in large, thin-walled cells. But toward the exterior of the mass of endosperm, the starch diminishes in proportion, and albuminoids, fats and ash become more abundant. The laxative materials of the endosperm, probably albuminoid in nature, also increase, relative to the other albuminoids, as the exterior is approached, and among the ash constituents, the lime grows relatively less, the magnesia more abundant.

The process of milling has for its object the powdering of the grain and the removal of the less desirable portions. The germ is removed because flours retaining it, tend, on standing, to darken and become ill-flavored. The outer layers are removed as bran. This is not, however, composed wholly of the epidermis and color layers, but also includes a large proportion of the endosperm, more especially of the outer, albuminoid layers of it. When separately prepared, these outer layers constitute the middlings, a dark flour making a "runny" dough. In general, the milling process commonly yields but 70 to 75 per cent. of flour and 25 to 30 per cent. of bran and middlings, including the germ, as its separation from other by-products is not common in many mills.

The character and proportion of the several milling products varies, of course, both with the character of the grain and the detailed method of milling. There are three principal methods of milling, two stone-milling processes and one roller process. Formerly, the flour was thoroughly ground by a single run through close-set stones; complete purification was not possible by such a process. This was followed by high-milling, in which the grain was coarsely ground between stones less closely set, the fine flour bolted out, and the middlings then reduced by repeated grinding between more closely set stones. This latter process is excellently well adapted to soft winter wheat, but not so well to the harder spring varieties. For these, the roller process is best in which hardened steel rolls are employed to crack the brittle grain, the products of the several breaks being successively bolted as the grain goes between rolls more and more closely set. Besides the milling machinery proper, all good mills are to-day equipped with screening, blowing and brushing machines for the removal of foreign seeds, gravel and dust.

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*Bulletins 4 and 9, Chemical Division, U. S. Dept. of Agric.

Teller* reports the distribution of materials in several milling operations: A. 7,000 pounds of mixed wheat; mill, 7 breaks, 40 bushels per hour capacity; B. Red wheat and C. Fulcaster, 3,000 pounds of each on a small 4-break mill of 7 bushels per hour capacity.

Yield of Parts in Percentages.

	A.	B.	C.
Patent flour,	12.11	17.65	25.80
Straight flour,	56.63	50.35	42.00
Low grade flour,	3.55	2.32	3.87
Shorts,		1.10	
Dust-room contents,		.82	1.17
Bran,	23.37	24.10	23.80
Ship-stuff,	2.48		1.13
Tailings,			.33
Screenings,	1.1	2.70	1.83
Sample taken,		.05	
Loss,	.7	.91	.07

The proportions of "patent" and "straight" flours differ much in the several cases, but the entire yields of good quality flour in the three trials are respectively 68.74, 68.00 and 67.80, figures agreeing excellently well. The quantities of epidermis, germ, etc., classed as bran, also exhibit little difference. The names and proportions of the several minor by-products differ very much, however.

For the composition of the several products, analyses of those of the first two of the above milling tests will suffice:

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* Bulletin 42, Arkansas Experiment Station.

Composition of Milling Products from Wheat.

	Grain.	Patent flour.	Straight flour.	Low grade flour.	Shipstuff.	Dust room products.	Bran.	Germ.
A. *Mixed Wheat:*								
Water,	13.90	13.75	13.90	13.22	12.25	....	12.85	6.80
Ash,	2.15	.33	.47	.90	3.12	....	5.80	4.65
Protein,*	12.31	9.69	10.37	12.88	16.36	....	15.56	36.00
Fiber,	2.17	.17	.26	.74	3.55	....	6.14	1.60
Nitrogen-free extract,	63.32	75.01	73.75	70.56	59.02	....	54.45	36.55
Fat,	2.15	1.05	1.25	1.70	4.80	....	5.20	14.38
B. *Red Wheat:*								
Water,	13.70	14.05	14.04	13.90	13.50	13.04	12.55	....
Ash,	1.85	.26	.35	.78	1.21	2.81	5.85	....
Protein,*	11.40	8.49	9.80	13.79	14.82	12.65	6.30	....
Fiber,	2.03	.17	.22	.54	.98	6.06	6.51	....
Nitrogen-free extract,	69.17	76.10	74.32	69.19	66.99	62.29	53.99	....
Fat,	1.85	.93	1.27	1.80	2.50	3.15	4.80	....

*In these analyses estimated as 5.7 times the percentage of nitrogen found.

The five products last named are sold largely or exclusively as cattle-foods, either under the above names or under others.

Red-dog flour is the name given to the poorest grade of flour, so named because it is "off color."

The term "*middlings*" is used by some manufacturers to cover everything except the high-grade flours and bran; in many cases, indeed, a very considerable proportion of bran is included in the product. *Shorts* and *ship-stuff* are terms applying to somewhat varying grades of middlings, the former being, in fact, closely related to bran, but containing less fiber and ash.

The terms *mixed feed* or *wheat feed* are applied to mixtures of middlings, bran and other "wheat offals," and, in some instances, are in part composed of "red dog."

Owing to the wide latitude in the use of the several trade names of milling products, it is clear that the purchaser can have from the name alone, only a very imperfect idea of the composition and nutritive value of the various wheat offals, especially those sold as middlings and as mixed feed.

Furthermore, even in the case of brans, the Connecticut and Massachusetts controls have found a considerable amount of adulteration, admixtures of corn-cob and wastes from broom-corn being introduced. The latter control states that this was particularly true of certain brans brought from Tennessee and Kentucky.

The following samples of wheat products were submitted by Department agents during the current year:

Wheat Grain.

No.	Brand.	Manufacturers.	Dealers.	Cost per ton.
144	Scorched wheat for poultry.	Empire Grain and Elevator Co., Binghamton, N. Y.	Snyder Bros., Dalton, Pa.,	$21 00

Upon analysis, this sample showed:

	Moisture, per cent.	Protein, per cent.	Fat, per cent.
	9.75	12.69	2.01
Average winter wheat,	10.50	11 80	2.10

The grain has evidently suffered little deterioration of its nutritive value by scorching.

Wheat Bran.

Of wheat bran, the Department agents submitted 38 samples. In the majority of instances, no designation as to the character of the wheat from which the sample was derived, whether "winter" or "spring," was given. Such brans are grouped together. The samples received were as follows:

No.	Manufacturer.	Dealer.	Price per ton.
	Winter Brans.		
277	C. F. Dyer, Millersburg. Pa.,	L. T. Slight,	$20 00
201	Hunter Bros., St. Louis, Mo.,	Chas. Friel, Pittsburg,	22 00
33	Milton Floury, Walters, Pa.,	C. W. Walter, Walters,	19 00
211	Warwick & Justice, Massilon, O.,	Peter Bock, Pittsburg,	20 00
27		Penn Traffic Co., Ltd., Johnstown, Pa.,	20 00
	Spring Brans.		
179	Dwight M. Baldwin, Jr., Graceville, Minn.,	Geo. O. Wilt,	18 00
222	C. A. Foster, Carnegie, Pa.,	McClelland & Siple, Pittsburg,	20 00
262	Full Frank Grain Co., Milwaukee, Wis.,	Cyrus Romberger, Lykens,	18 00
278	N. W. Consolidated Milling Co., Minneapolis, Minn.	A. S. Somes, Halifax,	19 00
281	G. D. Stevens & Co., Minneapolis, Minn.,	A. M. Pike, Halifax,	20 00
134	Washburn, Crosby Co., Minneapolis, Minn.,	Snyder Bros., Dalton, Pa.,	19 00
119	Weston Mill Co., Scranton, Pa.,	Weston Mill Co., Scranton, Pa.,	20 00
266		S. B. Vance, Middletown, Pa.,	20 00
268		Joseph Burkholder, Hummelstown, Pa.,	19 00

No.	Manufacturer.	Dealer.	Price per ton.
	Brans not Classified.		
105	D. P. Barber & Sons, Minneapolis, Minn.,	W. K. Heebner, West Point, Pa.,	18 00
176	Bare Milling Co., Roaring Springs, Pa.,	Bare Milling Co., Roaring Springs, Pa.,	....
255	Bliss & Merrick, Corry, Pa.,	Bliss & Merrick, Corry, Pa.,	18 00
171	Clapper Bros., Martinsburg, Pa.,	Clapper Bros., Martinsburg,	19 00
187	Clapper Bros., Martinsburg, Pa.,	Clapper Bros., Martinsburg,	17 00
248	Densmore Bros., Erie, Pa.,	Densmore Bros., Erie, Pa.,	17 00
66	Eclipse Milling Co., Brownsville, Pa.,	Eclipse Milling Co., Brownsville, Pa.,	19 50
71	Gaddis Co., Uniontown, Pa.,	M. H. Clark, Uniontown, Pa.,	20 00
60	David Hartz, Morgantown, Pa.,	David Hartz, Morgantown.	19 00
244	Frank L. Heath, Corry. Pa.,	Frank L. Heath, Corry, Pa.,	18 00
199	Hunter Bros., St. Louis, Mo.,	Byrne & Steele, Pittsburg, Pa.,	20 00
159	F. & I. Mentzer, Frankstown, Pa.,	F. & I. Mentzer, Frankstown, Pa.,	18 00
2	Northwestern Milling Co., Minneapolis, Minn.	L. Read, Chambersburg, Pa.,	17 00
221	Pittsburg Milling Co.. Pittsburg, Pa.,	Wm. Fisher, Pittsburg, Pa.,	18 00
104	Phi. H. Postal Milling Co., Mascoutah, Ill.	W. K. Heebner, West Point, Pa.,	19 00
44	Seaboard Milling Co.. Reading, Pa.,	A. N. Kissinger & Son, Reading, Pa.,	19 00
56	Shaffer, Wanner & Co.. Fleetwood, Pa.,	M. C. Dietrich, Kempton, Pa.,	19 00
218	J. W. Smith & Co., Pittsburg. Pa.,	M. E. Coleman, Pittsburg, Pa.,	21 00
6	Truesdale & Speer, Minneapolis, Minn.,	Coyle & Diehl, Chambersburg, Pa.,	17 00
8	....	B. A. Betts,	19 00
15	....	Gustav Bostert, Johnstown, Pa.,	18 00
108	....	Trenton Milling Co., Morrisville,	17 00
114	....	Morris Briggs, Woodbury, Pa.,	18 00
223	(In Ohio),	C. Beckert, Allegheny, Pa.,	18 00

Percentage Composition of Brans.

Number.	Moisture.	Protein.	Fat.	Remarks.
Winter Brans.				
277,	9.13	15.56	3.92	
201,	9.11	15.31	4.04	
33,	9.89	14.13	4.34	Crude fiber, 8.85 per cent.
211,	10.44	16.50	4.04	
27,	9.46	14.44	4.94	Crude fiber, 11.10 per cent.
Range,	9.11-10.44	14.13-16.50	3.92-4.94	
Average,	**9.43**	**15.19**	**4.26**	
Spring Brans.	9.57	14.44	5.08	Crude fiber, 11.88 per cent.
179,				
222,	9.04	15.19	5.03	
262,	9.63	15.56	4.86	
278,	9.08	15.44	4.88	
281,	10.35	14.44	4.04	Crude fiber, 9.29 per cent.
134,	9.33	14.31	4.49	Crude fiber, 11.88 per cent.
119,	10.18	15.00	4.32	Crude fiber, 10.00 per cent.
266,	9.86	14.31	4.51	Crude fiber, 12.12 per cent.
268,	9.27	14.88	4.63	Crude fiber, 12.62 per cent.
Range,	9.04-10.35	14.31-15.44	4.04-5.08	
Average,	**9.65**	**14.84**	**4.63**	
Brans not Classified.				
105,†	10.59	16.94	4.89	
176,*	9.47	16.00	4.25	
255,*	9.80	15.06	4.38	Marked "coarse."
171,*	9.89	15.56	4.66	
187,*	10.66	14.06	3.73	Crude fiber, 7.90 per cent.
248,*	10.04	15.31	3.82	Marked "coarse."
66,*	9.72	15.94	3.92	
71,*	9.35	15.81	4.69	
60,*	10.56	16.31	3.71	
244,*	9.63	15.63	4.65	Marked "coarse."
199,*	10.13	15.31	4.43	
159,*	9.44	14.88	4.02	
2,†	10.68	14.94	4.42	Fiber, 9.50 per cent.
221 *	10.29	16.69	4.86	
104,†	10.34	15.94	4.78	

Number.	Moisture.	Protein.	Fat.	Remarks.
44,*	10.38	16.06	4.26	
56,*	10.47	14.06	4.36	
218,*	10.54	15.88	4.09	
6,†	9.83	15.38	5.02	
8,	9.89	14.31	4.66	
15,†	9.23	14.88	4.79	Fiber, 10.82 per cent.
108,	8.66	16.19	5.02	
114,	8.76	15.25	4.57	
223,*	10.01	15.06	4.30	
251,	9.75	15.69	4.86	
Range,	8.66-10.68	14.06-16.94	3.71-5.02	
Average,	10.02	15.49	4.45	
Range of all samples designated or supposed from location of mill to be winter wheat,	9.11-10.54	14.06-16.69	3.71-4.94	
Average,	9.88	15.40	4.26	
Range, spring wheat,	9.04-10.68	14.31-16.94	4.04-5.08	
Average,	9.82	15.12	4.70	
Range for all brans analyzed,	8.66-10.68	14.06-16.94	3.71-5.08	
Average,	**9.54**	**15.30**	**4.48**	

* Supposed from location of manufacture to be derived from winter wheat.

† Supposed from place of manufacture to be derived from spring wheat.

A microscopic examination of the foregoing samples revealed little of special interest except in a few cases:

No. 27 was quite dirty; a small quantity of oat hulls and the black hulls of a weed seed (*Polygonum dumetorum var. scandens*) in considerable quantity. This weed is related to buckwheat and its hulls, while of probably very slight food value, are not known to be directly injurious to animals.

No. 222 contains somewhat more oat hulls, but fewer weed seeds. The latter are chiefly *Polygonum.*

No. 262 shows rather more oat hulls; the amount is, however, probably under 5 per cent.

No. 8 contains some straw, though in small proportion.

These results indicate that the process of winnowing is not thoroughly carried out in all mills and that, in some mills, either very impure wheat is ground or oat hulls are added to the contents of the bran bin. In none of the above cases is the amount of impurity present such as to indicate a deliberate attempt to substitute other cheaper substances for bran; but lack of care for the purity of this feeding stuff is indicated.

Compared with the brans sold recently in neighboring States, the Pennsylvania samples make the following showing:

Comparison of Brans from Different States.

	Number of analyses.	Protein, Per Cent.			Fat, Per Cent.		
		Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
Winter Wheat:							
Pennsylvania, ...	5	16.50	14.13	15.19	4.94	3.92	4.26
New England States, 1898-9,.	45	17.8	13.6	15.5	5.6	3.5	4.4
Spring Wheat:							
Pennsylvania, ...	9	15.44	14.31	14.84	5.08	4.04	4.63
New England, 1898-9, ...	53	17.5	15.1	16.1	5.6	4.4	4.9
All Varieties:							
Pennsylvania, ...	38	16.94	14.06	15.30	5.08	3.71	4.48
New England, 1898-9, ...	120	17.9	13.6	15.8	5.6	3.5	4.7
New York, 1898-9, ...	12	17.13	13.37	15.36	5.64	3.40	4.79

In general, the range of composition found in the Pennsylvania samples is not greater than was found to occur in New York during the first year of the operation of the food control law enacted by the latter State; but the brans sold in New England, where examinations of the cattle foods have been made for a longer period, show a quite distinct superiority in average composition.

Determinations of fiber were made in a number of instances where the proportion of protein fell below 14.5 per cent. The percentages of this constituent found in such cases vary from 7.90 to 12.62, quantities very similar to those obtained by Connecticut* in recent bran analyses.

The number of brans that were distinctly indicated to be spring and winter wheat brans respectively, is too small to afford a basis for comparison. A larger number of analyses reported sometime since by the Pennsylvania State College Agricultural Experiment Station,† exhibit a superiority in protein content for average spring bran exceeding that shown by the New England averages above indicated.

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*B. 130, pp. 22-5.

† Bulletin 48, December, 1899.

Wheat Middlings.

There were selected by Department agents 38 samples of wheat middlings, exclusive of those designated as "ship stuff" and "red dog flour." The kind of wheat from which they were derived was specifically stated only in case of three samples from winter wheat. The samples selected were as follows:

No.	Manufacturer.	Dealer.	Price per ton.
164	Dwight M. Baldwin, Minneapolis, Minn.,		$21 00
196	Bare Milling Co., Roaring Spring, Pa.,	Bare Milling Co., Roaring Springs, Pa.,	
241	Bliss & Merrick, Corry. Pa.,	Bliss & Merrick, Corry, Pa.,	18 00
73	Champion Milling Co.. Brownsville, Pa.,	L. C. Waggoner, Brownsville, Pa.,	20 00
166	Clapper Bros., Martinsburg, Pa.,		20 00
193	Clapper Bros., Martinsburg, Pa.,	Clapper Bros., Martinsburg,	18 00
284	C. F. Dyer, Millersburg. Pa.,	S. T. Slight,	20 00
226	Elkhart Swan Milling Co., Chicago, Ill.,	Wm. Fisher, Allegheny, Pa.,	17 00
126	Empire Grain and Elevator Co., Binghamton, N. Y.	Snyder Bros., Dalton, Pa.,	18 00
233	C. A. Foster, Carnegie, Pa.,	McClelland & Siple, Pittsburg, Pa.,	20 00
265	Full Frank Grain Co., Milwaukee, Wis.,	Cyrus Romberger, Lykens, Pa.,	19 00
69	Gaddis & Co., Uniontown, Pa.,	M. H. Clark, Uniontown, Pa.,	20 00
61	David Hartz, Morgantown,	David Hartz, Morgantown,	19 00
220	Hunter Bros., St. Louis. Mo.,	Chas. Friel, Pittsburg, Pa.,	22 00
228	Hunter Bros., St. Louis, Mo.,	C. Kellner, Allegheny,	19 00
230	Hunter Bros., St. Louis, Mo.,	Byrne & Steele, Pittsburg,	20 00
14	McDermott, Wertz & Co., Johnstown, Pa.,	McDermott, Wertz & Co., Johnstown, Pa.,	20 00
154	F. & I. Mentzer, Frankstown, Pa.,		19 00
34	Milton Floury, Walters, Pa.,	C. W. Walter, Walters, Pa.,	20 00
1	Northwestern Co., Minneapolis, Minn.,	John Reside, Chambersburg,	18 00
215	Northwestern Elevator Co., Toledo, O.,	D. Whitmeyer, Allegheny, Pa.,	18 50
24	Pillsbury Milling Co., Minneapolis, Minn.,	J. C. Widman Shuler, Johnstown, Pa.,	18 00
216	Pittsburg Milling Co., Pittsburg, Pa.,	Branthoover Bros., Pittsburg, Pa.,	22 00
213	Pittsburg Milling Co., Pittsburg, Pa ,	Brown & Co., Pittsburg, Pa.,	22 00
45	Seaboard Milling Co., Reading, Pa.,	A. N. Kissinger & Son, Reading, Pa.,	20 00
51	Shaffer, Wanner & Co., Fleetwood, Pa.,	M. C. Dietrich, Kempton, Pa.,	21 00
46	Steelton Flour Mills Co., Steelton, Pa.,	A. N. Kissinger & Son, Reading, Pa.,	22 00
165	The George Tileston Milling Co., St. Cloud, Minn.	C. L. Hoof, Altoona, Pa ,	15 00
109	Trenton Milling Co., Trenton, N. J.,	Trenton Milling Co., Morrisville, Pa.,	17 00
7	Truesdale & Speer, Minneapolis, Minn.,	Coyle & Diehl, Chambersburg, Pa.,	17 00
79	Warren Mills Co., Warren, Pa.,	Warren Mills Co., Warren, Pa.,	18 00
203	Warwick & Justice, Massilon, Ohio,	Peter Bock, Pittsburg, Pa.,	20 00
120	Weston Mill Co., Scranton, Pa.,	Weston Mill Co., Scranton. Pa.,	20 00
103	E. S. Woodworth & Co., Minneapolis., Minn.	W. K. Heebner, West Point, Pa.,	19 00
18		Gustav Bostert, Johnstown, Pa.,	19 00
20		John Thomas & Co., Johnstown, Pa.,	18 00
75	(Cleveland, O.),	P. Davis, Sugar Grove, Pa.,	22 00
227	(In Ohio),	C. Beckert, Allegheny, Pa.,	19 00
260		Joseph Burkholder, Hummelstown, Pa.,	19 00

Percentage Composition of Wheat Middlings.

No.	Description.	Moisture.	Protein.	Fat.	Remarks.
164‡	Middlings,	10.58	17.44	5.31	
196†	Pure middlings,	11.31	12.94	2.81	Ash, 2.03 per cent.; fiber, 2.08 per cent.
241	Middlings,	9.75	14.31	3.72	Ash, 4.86 per cent.; fiber, 7.03 per cent.
73	Middlings,	10.90	13.88	3.20	Ash, 2.79 per cent.; fiber, 2.33 per cent.
166†	Middlings,	9.87	14.56	4.18	Ash, 3.49 per cent.; fiber, 4.26 per cent.
193†	Finished middlings,	10.05	15.75	4.18	
284*	Middlings,	10.08	17.94	5.58	
226	Brown middlings,	10.32	16.25	5.41	
126	Brown middlings,	9.61	14.81	5.10	
233	Wheat middlings, No. 2 white,	9.61	17.81	5.63	
265‡	Western red middlings,	9.76	18.50	4.81	
69	Middlings,	10.50	15.06	3.43	
61†	White middlings,	12.10	13.13	1.85	Ash, 1.09 per cent.; fiber, 1.08 per cent.
220	Middlings, No. 2 white,	9.93	14.88	3.57	
228	Middlings, No. 2 fancy,	9.50	16.76	4.94	
230	Middlings, brown,	9.95	16.25	4.84	
14	Wheat middlings,	10.23	16.94	4.30	
154	Middlings,	10.21	16.13	4.40	
34†	Wheat middlings,	11.33	13.94	3.62	Ash, 2.21 per cent.; fiber, 2.10 per cent.
1‡	Middlings,	10.08	16.88	5.27	
215	Middlings, No. 2,	10.13	15.75	3.98	
24‡	Brown middlings,	9.57	16.69	4.94	
216*	Winter wheat middlings,	10.28	15.88	4.24	
213	Middlings, No. 2,	10.29	17.13	4.53	
45	Red middlings,	10.81	16.69	5.38	
51†	Red middlings,	11.58	14.44	3.91	Ash, 2.479 per cent.; fiber, 2.63 per cent.
46†	White middlings,	10.98	17.13	4.66	
165‡	Red middlings,	9.99	17.19	5.30	
109	Middlings,	9.03	16.69	5.97	
7‡	Middlings,	9.24	16.38	5.89	
79	Wheat middlings,	11.43	14.75	4.46	
203*	Winter wheat middlings,	9.89	14.63	3.77	Ash, 4.03 per cent.; fiber, 5.49 per cent.
120	Wheat middlings,	9.16	17.50	6.26	
103‡	Wheat middlings,	11.19	17.81	5.45	
18	No. 2 middlings,	9.64	17.06	4.63	
20	Brown middlings,	9.63	18.38	5.61	

75	"B" middlings,	10.59	16.75	5.86	
227	Brown middlings,	10.42	15.75	4.31	
260‡	Western middlings,	10.42	14.63	4.04	Ash, 3.75 per cent.; fiber, 4.93 per cent.
	Range of composition of all samples,	9.24-12.10	12.94-18.50	1.85-6.26	
	Average composition,	**10.26**	**16.05**	**4.60**	
	Range of composition of samples (* & †) designated or judged by location to be from winter wheat (10 samples),	9.87-12.10	12.94-17.94	1.85-5 58	
	Average,	10.74	15.04	4.63	
	Range of composition of samples (‡) judged by location to be from spring wheat (10 samples),	9.24-11.19	14.63-18.50	3.98-5.89	
	Average,	**10.11**	**16.81**	**5.00**	

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* Designated as from winter wheat. †Judged by location to be from winter wheat.

‡ Judged by location to from spring wheat.

These samples compare with those analyzed, 1898-9, in New England and New York, as follows:

	Number of analyses.	Protein. Per Cent.			Fat. Per Cent.		
		Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
Pennsylvania,	39	18.50	12.94	16.05	6.26	1.85	4.60
New England,	135	22.2	12.4	17.0	7.1	2.6	5.0
New York,	14	20.06	14.81	17.76	8.51	3.90	5.53

In this case also, while the range of composition is not exceptionally wide, the average percentages of the more valuable materials are distinctly below those exhibited in States subject to a cattle-food control.

In nine samples whose protein was less than 14.75 per cent., determinations of fiber and ash were made with results ranging from 7.03 to 1.08 per cent. for fiber, and 4.86 to 1.90 per cent. for ash. Twenty-three samples analyzed in Connecticut in 1899, showed fiber, 10.31 to 1.05 per cent., and ash, 5.52 to 2.86 per cent., and fourteen samples analyzed in New York, the same year, showed fiber, 10.35 to 2.17 per cent., and ash, 5.10 to 2.52 per cent. Clearly, the low protein in the Pennsylvania samples is not attributable to excessive quantities of these two elements introduced by conspicuous additions of foreign matters. These analyses would not show the addition to a pure middlings of large quantities of the fluffy dust from the dust room, in which the hairs from the tip of the grain are deposited as a result of the modern milling processes.

The name attached to the brand gives no certain indication of feeding value. This is well exhibited by the range of protein content found in those specimens to which some particular grade name was given.

"Pure," "white," "finished,"	17.13 to 12.94 per cent.
"No. 2 white,'	17.81 to 14.88 per cent.
"Red,"	18.50 to 14.44 per cent.
"Brown,"	18.38 to 14.81 per cent.

The "white" middlings contain, of course, more starch than the "brown" middlings, bran being more abundant in the latter.

Microscopic examination with a low-power lens discovers no conspicuous foreign material except in case of No. 75, which is rendered quite impure by the presence of numerous weed seeds.

Wheat Shorts.

The "shorts," as previously explained, are chiefly composed of the same tissues of the wheat grain as those from which the bran is derived.

Three samples were taken bearing this specific name:

No.	Manufacturer.	Dealer.	Price per ton.
58	David Hartz, Morgantown, Pa.,	David Hartz, Morgantown, Pa.,	$19 00
253	———, Middletown, Pa.,	S. B. Vance, Middletown, Pa.,	19 00
261	———, Minneapolis, Minn.,	J. B. Deckard, Middletown, Pa.,	20 00

The composition of these samples was found to be as follows (per cent.):

Number.	Moisture.	Protein.	Fat.
58,	9.88	18.31	5.97
253,	10.32	16.00	4.84
261,	9.59	15.25	4.72
Average,	**9.93**	**16.52**	**5.18**

Jenkins and Winton's compilation of American analyses made prior to 1892 shows the following figures (per cent.):

	Moisture.	Protein.	Fat.
Highest,	15.5	19.4	6.1
Lowest,	4.1	11.1	2.5
Average,	11.8	14.9	4.5

The Pennsylvania samples, while some are much richer in protein and fat than others, are well above the averages given by Jenkins and Winton.

Microscopic examination failed to show any adulteration.

Ship Stuff.

Of this variety of middlings, but one sample was examined:

No.	Manufacturer.	Dealer.	Price per ton.
269		J. B. Deckard, Middletown, Pa.,	$20 00

Its percentage composition was as follows:

	Moisture.	Protein.	Fat.
Composition,	10.53	16.13	3.88

Red Dog Flour.

This low grade flour is often included with the middlings. Four samples were submitted for analysis:

No.	Manufacturer.	Dealer.	Price per ton.
180	Dwight M. Baldwin, Graceville, Minn.,	Geo. P. Wilt, Duncanville, Pa.,	$18 75
276	Pillsbury Co., Minneapolis, Minn.,	Cyrus Romberger, Lykens, Pa.,	19 00
273	G. D. Stevens, Minneapolis, Minn.,	A. M. Pike, Halifax, Pa.,	20 00
17		Gustave Bostert, Johnstown, Pa.,	20 00

The results of analysis were as follows (per cent.):

No.	Description.	Moisture.	Protein.	Fat.
180	Red dog middlings,	10.16	17.94	5.28
276	Pillsbury red dog middlings,	9.54	20.25	5.77
273	Red dog flour,	10.16	19.13	4.72
17	"Daisy red dog,"	9.72	19.25	3.70
	Range of composition,	9.54-10.16	17.94-20.25	3.70-5.77
	Average,	**9.90**	**19.14**	**4.87**

The microscope reveals no foreign matters in these samples. This product is seen to contain considerably more protein than either of the wheat products already described.

Wheat Feeds.

Instead of selling the various products of the mill, other than flour, separately under their distinctive names as bran, middlings, etc., many millers combine several or all of these by-products and sell them under the name of "wheat feed." It is clear that quite a wide range of composition might be expected in a feeding-stuff of such varying method of preparation. Only three samples bearing this name were submitted by the Department agents. They were:

No	Manufacturer.	Dealer.	Price per ton.
146	Empire Grain and Elevator Co., Binghamton, N. Y.	Snyder Bros., Dalton, Pa.,	$19 00
136	C. H. Sears, Clark's Summit, Pa.,	C. H. Sears, Clark's Summit,	19 00
9	(Akron, O.),	J. L. Hockensmith,	20 00

The results of analysis were as follows (per cent.):

No.	Description.	Moisture	Protein.	Fat.	Fibre.
146	Spring wheat bran and middlings,	9.78	15.94	4.49	....
136	Wheat feed, bran and shorts,	9.20	10.19	2.69	19.84
9	Buckeye wheat feed,	10.08	16.50	4.53	....
	Range of composition,	9.20-10.08	10.19-16.50	2.69-4.53	....
	Average,	**9.69**	**14.21**	**3.90**	....

On examination under the microscope, the following facts appear:

No. 146. Bran is the chief constituent. The fine material contains many of the hairs which, in the best mills, go to the dust room. Some whole oats and oat hulls are present, but these form a very small percentage of the entire feed.

No. 136. While the bulk is chiefly composed of bran, the sample contains a large amount of fibrous material, finely divided and closely resembling, under a power of 50 diameters, the compact, fibrous structure and yellowish tint of corn cob. Some oat hulls were also present.

No. 9. Chief bulk composed of bran; the amount of middlings present is small; there is present a large amount of the hair from the tip of the grain, indicating a probable admixture of the dust room contents. A little oat hull appears, but is not conspicuous.

Only one of these brands has been analyzed in other States, viz: "Buckeye wheat feed." The composition shown by these analyses is as follows:

	Protein, per cent.	Fat, per cent
Connecticut (3 samples),	17.75-16.37	4.41-4.37
New York (1 sample),	15.38	5.12

The Pennsylvania sample is up to the average for the brand.

Wheat feeds, in general, as shown by 219 analyses of market feeds made in New England States, have the following range of composition:

	Protein, per cent.	Fat, per cent.
Highest,	20.0	5.8
Lowest,	14.0	3.6
Average,	16.6	4.7

The fiber in 48 samples recently analyzed in Connecticut, ranges from 5.20 to 9.41 per cent.

No. 136 shows a content of protein and fat far inferior to the minimum shown by the New England analyses for goods of this class. The material was therefore examined for fiber and found to contain fully twice as much as the maximum observed in such goods. A mixture of equal parts of average wheat feed and fine ground corn cob would contain, protein, 9.5 per cent.; fat, 2.6 per cent.; fiber, 18.5 per cent. These figures quite nearly approximate those found for No. 136.

Wheat Flour.

While not strictly coming within the list of cattle-foods, a sample of "Pillsbury's Best" wheat flour, manufactured by the Pillsbury & Washburn Co., of Minneapolis, Minn., and sold by Snyder Bros., Dalton, Pa., at $4.60 per barrel, was submitted for analysis. Examined by the methods adopted in the preceding cases, it gave the following results:

No. 121. Moisture, 11.65; protein, 11.69; fat, .60.

RYE PRODUCTS.

Rye in both botanical and general chemical characters closely resembles wheat. When subjected to milling, it is separated into a series of products similar to those which wheat produces.

The composition of the entire grain is represented by analyses of 57 samples from various portions of the United States reported by Richardson:*

	Average, per cent	Highest, per cent.	Lowest, per cent.
Moisture,	8.67	10.00	7.00
Ash,	2.09	3.72	1.31
Protein,	11.32	15.58	8.75
Fiber,	1.46	1.90	1.10
Nitrogen-free extract,	74.52	77.54	68.74
Fat,	1.94	2.91	1.38
	100.00	....	....

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* *Op. cit.*, Bull. 9, p. 57.

So that, in general, rye contains less protein and fiber and more starch than wheat. On account of both its nutritive value and dietetic effects, it and its products are particularly prized for feeding horses. Lavalard,* after numerous experiments with cab horses and those in the cavalry and artillery services of the French army, found the effects more variable than those of other grains and believes this is due to variability of composition.

The following samples of rye products were submitted:

No.	Manufacturer.	Dealer.	Price per ton.
	Rye Chop.		
40	John D. Bieber, Oley, Pa.,	A. N. Kissinger & Son, Reading, Pa.,	$25 00
195	C. E. Lingafelt, Hollidaysburg, Pa.,	C. E. Lingafelt,	25 00
12	McDermott, Wertz & Co., Johnstown, Pa.,	McDermott, Wertz & Co., Johnstown,	28 00
	Bolted Rye Chop.		
270	Levi Brant, Harrisburg, Pa.,		25 00
	Rye Middlings.		
29	Mann & Allshouse, Easton, Pa.,	Mann & Allshouse, Easton, Pa.,	18 00

The percentage composition of these feeding-stuffs was as follows:

No.	Description.	Moisture.	Protein.	Fat.	Remarks.
40	Rye chop,	11.49	9.63	2.19	
195	Rye chop,	10.32	11.25	2.09	
12	Rye chop,	11.68	10.00	1.03	Coarse.
	Range of composition,	10.32-11.68	9.63-11.25	1.03-2.19	
	Average composition,	**11.16**	**10.29**	**1.77**	
270	Bolted rye chop,	10.02	10.75	1.66	
29	Rye middlings,	9.63	13.66	3.36	

The microscope does not indicate any adulteration in these samples.

In composition, the chops fall well within the range of composition for whole grain given above, except the percentage of fat in No. 12, which is below the minimum there given. The composition of the middlings is normal; they are seen to have considerably less protein and fat than average wheat middlings.

BARLEY AND ITS BY-PRODUCTS.

Barley, though grown in America especially for malting purposes, is used in many countries as a horse feed, in place of oats. Lavalard† mentions such substitution as general in Italy, Spain and Algeria, where oats cannot be profitably raised.

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* Experiment Station Record, **12** 16.

†*Ib.*, 14.

Experiments made by the *Compagnie generale des omnibus* of Paris, with both draught and saddle horses during twenty years, show that while barley can replace oats in horse rations, a somewhat larger quantity must be employed; also that barley bran is very tough, with a tendency in inferior varieties to seriously lower the amount of digestible matter.

A study by Richardson* of sixty samples of barley grown in different parts of the United States gave the following results:

	Average.	Highest.	Lowest.
Composition (per cent.), whole grain:			
Water,	6.53	9.15	4.53
Ash,	2.89	4.43	1.50
Protein,	11.33	14.88	8.75
Fiber,	3.80	4.65	2.64
Nitrogen-free extract,	72.77	76.79	68.99
Fat,	2.68	3.54	2.06
	100.00		
Percentage of hull,	15.22	16.94	12.55
Weight per bushel (pounds),	54.0	67.9	48.5

No samples of this grain have been submitted for analysis; it enters, however, into the composition of a number of mixed feeds elsewhere discussed.

As remarked above, barley is grown in America chiefly for malting purposes. When the grain is moistened and kept at a certain temperature it germinates, the ferments it contains become active and convert the starch into maltose and finally into glucose, which is capable of solution in water and of alcoholic fermentation by yeast. The germinated barley is dried, freed from its sprout, which is injurious to the malted liquor, and is then known as "malt," which, either alone or together with other starchy materials whose solution it promotes, is used in the manufacture of malted liquors. A very large proportion of the protein and fat, together with some valuable carbohydrates remain in the spent malt or grains, so that these become, in turn, valuable as cattle-feeds; for this purpose they are either used in a fresh, moist state or in a kiln-dried condition.

According to Stein,† 100 parts of barley yield 92 of malt and 2.5 of sprouts, as follows:

Composition.	Barley.	Malt.	Sprouts.
Ash,	2.42	2.11	0.29
Protein,	12.28	10.98	0.77
Fiber,	19.86	18.76	0.89
Nitrogen-free extract,	61.88	58.06	0.47
Fat,	3.56	2.09	0.08
	100.00	92.00	2.50

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* Bulletin 9, Chemical Division, U. S. Dept. Agric., pp. 58-78.

† Wilde's Centrbl. 1860, **2** 8-23; Johnson, How Crops Grow, p. 359.

A loss of 6.5 parts occurs as the result of the life processes active during the malting.

No samples of "brewers' grains" have been submitted for examination at this time, but the following averages given by Jenkins and Winton* will suffice to give a general idea of their composition.

	Wet grains (15 analyses).			Dry grains (3 analyses).		
	Average.	Highest.	Lowest.	Average.	Highest.	Lowest.
Water,	75.7	79.4	68.6	8.2	11.9	6.2
Ash,	1.0	1.5	0.3	3.6	3.8	3.3
Protein,	5.4	6.9	4.3	19.9	20.3	19.3
Fiber,	3.8	5.6	3.1	11.0	11.6	10.2
Nitrogen-free extract,	12.5	15.9	9.6	51.7	56.8	46.1
Fat,	1.6	2.9	0.8	5.6	6.5	4.2
	100.0	....	....	100.0	....	....

Analyses of a related substance, "dried distiller's waste," made in this laboratory by C. A. Browne, Jr., and C. P. Beistle, Assistant Chemists† show that the nitrogen-free extract of the spent grains instead of being composed, as in the original malt, of starch and sugars chiefly, contains very little of these valuable nutrients, and is made up principally of pentosans of less certain feeding value.

Malt Sprouts.

Samples of malt sprouts have been received as follows:

No.	Manufacturer.	Dealer.	Price per ton.
113	(Bought in Philadelphia).	M. A. Kirby,	$17 50
117		Trenton Milling Co., Morrisville,	18 00
256		Sims Co.,	13 50

Their percentage composition is:

Number.	Moisture.	Protein.	Fat.
113,	9.49	24.00	1.78
117,	10.42	21.69	1.54
256,	12.95	23.19	1.50
Range,	9.49-12.95	21.69-24.00	1.50-1.78
Average,	**10.95**	**22.96**	**1.61**

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*Op. cit., p. 18.

† Journal American Chemical Society, April, 1901.

Some grains of malt were present in each case, as would be expected from the conditions of manufacture.

The composition agrees very well with Jenkins and Winton's average:

	Per cent.
Moisture,	10.2
Ash,	5.7
Protein,	23.2
Fiber,	10.7
Nitrogen-free extract,	48.5
Fat,	1.7
	100.00

The difference in price between Nos. 113 and 117, taken in southeastern Pennsylvania, and No. 256, taken in the northwestern corner of the State, is rather striking.

The value of this food as a low-priced balancing material is apparent.

OATS AND OAT PRODUCTS.

Owing to their composition and palatability to domestic animals, oats enter into a great variety of combinations with other grains in the preparation of a great variety of mixed feeds. Less extensively used than wheat and corn for the manufacture of breakfast foods, the various oat-meal preparations for human consumption leave, nevertheless, a large volume of residual material, chiefly oat hulls, for use in the manufacture of cattle foods. Because of the extensive use of oat hulls for this purpose, it is important to secure a clear knowledge of their composition and digestilibity relative to that of the whole grain.

Considering first the proportion of hull (consisting of the pallets and sometimes the glumes) to the entire grain:

The writer, working under the direction of Mr. Clifford Richardson,* determined this proportion for 166 samples of oats sent from all sections of the United States; the average was 30.03 per cent. of the entire grain. For the compact white, black and mixed oats of the north, weighing 38 pounds per struck bushel, the proportion was 29.3 per cent.; for the fluffy, red rust-proof oats of the south, weighing 34.5 pounds per bushel, the proportion was 30.92 per cent. The extreme range in percentage of hull was 20.72 to 44.63 per cent., the grain in the latter case being evidently immature.

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* Bulletin No. 9, Division of Chemistry, U. S. Department of Agriculture.

The Ohio Experiment Station from the examination of 69 varieties of oats, found a range in the percentage of hulls, of 24.6 to 35.2 per cent., average 30 per cent.

In the cleaned grain before milling the proportion of kernel is therefore 70 pounds per hundred; but, owing to the breakage of the kernel in milling, the yield of kernel is slightly reduced, being 67 pounds per hundred, on the average.

Under Richardson's directions, 179 samples of oats and 100 samples of oat hulls were analyzed, with the following percentage results:

	Kernel.	Hull.	Entire oats corresponding.
Moisture,	6.93	5.22	6.42
Ash,	2.15	5.59	3.18
Protein,	14.31	2.48	10.76
Fiber,	1.38	17.88	6.33
Nitrogen-free extract,	67.09	68.03	67.37
Fat,	8.14	.80	5.94
	100.00	100.00	100.00

While the kernels themselves are richer in protein than those of any other cereal, the adherent hull makes them, as fed, little richer than corn. However, the low digestibility of the fiber of the entire oat so reduces the proportion of digestible carbohydrates as to give to this feeding stuff a relatively high nutritive ratio. The hulls, considered alone, while they contain as much nitrogen-free extract as the kernel, really contain it less in the form of sugar and starch than in that of the less valuable pentosans, while the high fiber, low fat and low protein all tend to rank the hull with corn cob and straw in nutritive value.

The analyses reported by Richardson do not afford a convenient statement of the variations in the composition of American oats. For this, 30 analyses compiled by Jenkins and Winton may be used:

	Highest, per cent.	Lowest, per cent.	Average, per cent.
Moisture,	13.5	8.9	11.0
Ash,	3.6	2.0	3.0
Protein,	14.4	8.0	11.8
Fiber,	12.9	1.5	9.5
Nitrogen-free extract,	66.9	53.5	59.7
Fat,	5.8	3.4	5.0
	....	....	100.0

Despite the wide range of difference in the whole oats, the composition of the kernel is less affected by climatic conditions than is that of most other cereals, the proportion of husk to kernel being a more influential factor, and the compactness of the grain the best method of judging of its bushel value.

Ground Oats.

Only one sample of ground oats was submitted, viz: No. 123, manufactured and sold by the Weston Mill Co., of Scranton, Pa., at $25.00 per ton. Its composition was as follows:

	Per cent.
Moisture,	8.99
Protein,	9.25
Fat,	3.90

Therefore, while much below the average in the amounts present of its more valuable components, it comes safely within the range of variation for this grain.

Oat Feeds.

From the name, it might be anticipated that these feeding stuffs would differ little from ground oats. In fact, however, they are in many cases composed chiefly of the oat hulls left as a waste from oat meal manufacture. For this reason, a careful study of their composition is important.

Samples were submitted as follows:

No.	Manufacturer.	Dealer.	Price per ton.
3	Akron Cereal Co., Akron O.,	L. A. Read, Chambersburg, Pa.,	$16 00
102	Akron Cereal Co., Akron, O.,	W. K. Heebner, West Point, Pa.,	15 00
4	American Cereal Co., Akron, O.,	Coyle & Diehl, Chambersburg, Pa.,	17 00
5	Andrew Cullin Co., New York,	Coyle & Diehl, Chambersburg, Pa.,	16 00
183	Andrew Cullin Co., New York,	Geo. P. Wilt, Duncansville,	15 50
197	Andrew Cullin Co., New York,	Geo. P. Wilt, Duncansville,	14 00

Their analyses are as follows:

No.	Description.	Moisture.	Protein.	Fat.
3	Royal oat feed,	7.07	5.88	2.48
102	Royal oat feed,	8.27	6.19	2.50
4	Oat feed,	7.40	11.06	2.99
5	Oat feed,	7.28	7.81	3.67
183	Crescent oat feed,	7.46	6.69	3.04
197	Crescent oat feed,	7.15	6.75	3.45
	Range,	7.07-8.27	5.88-11.06	2.48-3.67
	Average,	**7.44**	**7.40**	**3.02**

These analyses distinctly show that, with the exception of No. 4, the feeds are largely composed of something other than the oat kernel. Assuming that the oats and hulls are of average composition, the analyses indicate that, with the exception named, the feeds contain at least one-half their weight of added oat hulls.

The condition of the hulls in the different samples is quite different, being coarse in some cases, fine in others. The Royal Oat Feed samples contain 38 to 48 per cent. of coarse hull, while the amount in Nos. 4 and 5 was less than 3 per cent.

No guaranties accompanied the lots from which these samples were drawn. In New York State, the Crescent Oat Feed is licensed with a guaranty of 11.0 per cent. of protein and 7.35 per cent. of fat, but a sample reported in September, 1900 (Bulletin No. 176, pp. 28-9, New York Exp. Station), showed only 7.8 per cent. protein and 3.5 per cent. fat, while three samples analyzed in New England between May, 1898, and January 1, 1900, contained an average of 7.9 protein and 3.3 per cent. fat. The quality of the goods sold in Pennsylvania not only falls below that guaranteed in New York, but also is materially inferior to that exhibited by the samples analyzed in New York and New England.

The Royal Oat Feed was guaranteed in New York State to have 8.25 per cent. protein and 4.14 per cent. fat; but a single analysis made there in 1900, showed only 5.1 per cent. protein and 2.5 per cent. fat.

While the variations in composition to which both the entire oat and the oat hulls are subject, make impossible any exact computation of the precise proportion in which they are combined to form a given mixture from its composition, the following statements based upon the average composition of the respective ingredients may be helpful:

	Protein, per cent.	Fat, per cent.
Equal parts of oats and oat hulls,	6.63	3.40
One-third oats, two-thirds hulls,	4.92	2.53

In this connection should be mentioned two feeds which are sold under names that are not descriptive:

No.	Manufacturer.	Dealer.	Price per ton.
91	Muscatine Oat Meal Co., Muscatine, Iowa,	J. Watson Craft, Ambler, Pa.,	$16 00
263	American Cereal Co., Chicago, Ill.,	J. B. Deckard, Middletown, Pa.,	16 00

Their analyses are (per cent.):

No.	Description.	Moisture.	Protein.	Fat.
91	Friends' consolidated dairy food,	8.58	6.31	3.08
263	Cereal feed,	7.23	4.06	1.55

The analyses immediately reveal the inferior character of these feeds.

Microscopic examination shows these two feeds to be chiefly composed of oat hulls, hair and dust, with more of the dust in the former of the two foods.

In general, the nutritive value of such feeds is little greater than that of corn stover. The term "concentrated foods" is not properly applied to them.

CORN.

From the fact that corn is the leading grain grown for cattle feeding and that, more than any other cereal, it is subjected to a great variety of manufacturing processes for the production of starch, glucose and a great variety of other articles of human consumption, especial interest attaches to its composition.

The percentage composition of the two great groups of varieties, the dent and the flint, is well represented by the figures for American analyses compiled by Jenkins and Winton.*

Percentage Composition of Corn.

	Dent (86 analyses).			Flint (68 analyses).		
	Average.	Highest.	Lowest.	Average.	Highest.	Lowest.
Moisture,	10.6	19.4	6.2	11.3	19.6	4.5
Ash,	1.5	2.6	1.0	1.4	1.9	1.0
Protein,	10.3	12.8	7.5	10.5	13.7	7.0
Crude fiber,	2.2	4.8	0.9	1.7	2.9	0.7
Nitrogen-free extract,	70.4	75.7	65.4	70.1	76.7	65.0
Fat,	5.0	7.5	3.1	5 0	7.1	3.4
	100.0	....	....	100.0	....	....

There is therefore little difference in the general composition of these two types of corn, notwithstanding their unlike appearance in form and usually in color. The greatest difference observed is in the smaller amount of fiber in the flint corn and in its wider range of composition as respects protein and nitrogen-free extract, and less range in fiber and ash.

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*Bulletin 11, Office of Experiment Station, U. S. Dept. of Agriculture.

Considering the range of variation, it is apparent that while the highest figure for nitrogen-free extract is but one-sixth greater than the lowest, the highest percentages of protein and fat are about twice as great as the lowest percentages; in the less important constituents, fiber and ash, the range of variation is even greater.

The kernel of the corn exhibits a subdivision into parts distinctly seen by the naked eye. Voorhees* has studied the composition of these several parts, which he describes somewhat as follows:

"a. The husk or skin, which covers the whole kernel; it consists of two distinct layers, the outer and inner, which when removed constitute the bran, and contain practically all the crude fiber of the whole grain.

b. "A layer of gluten cells, which lies immediately underneath the husk; it is yellow in color, and cannot be readily separated from the remainder of the kernel.

"c. The germ, readily distinguishable by its position and form; it also contains gluten, though it is particularly rich in oil and mineral constituents.

"d. The starchy portion of the grain, which is divisible into two sub-portions—a yellow, flinty part lying on the sides of the grain and made up of very compact cells and a lighter colored portion in which the cells are less compact; in both portions, however, starch is the principal material in the cells.

A somewhat imperfect separation of 100 kernels of new corn into skin, germ and endosperm (starchy and hard part) showed their proportion by weight and their percentage composition to be as follows:

Composition of Different Parts of Maize Kernel (per cent.).

	Original kernel.	Skin.	Germ.	Endosperm.
Proportion in 100 parts of the kernel,	100.00	5.56	10.17	84.27
Composition:				
Water,	24.74	15.29	29.62	24.66
Water-free substance,	75.26	84.71	70.38	75.34
Composition of water-free substance:				
Ash,	1.73	1.27	11.13	0.68
Protein,	12.65	6.60	21.71	12.23
Fiber,	2.02	16.45	2.88	0.65
Nitrogen-free extract (chiefly starch),	79.26	74.09	84.66	84.90
Fat,	4.34	1.59	29.62	1.54

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* 15th Ann. Rep., N. J., Agr. Exp. Station, p. 183.

On the basis of these figures, the distribution of materials of the constituents in 100 pounds of the new corn is as follows:

Distribution of Constituents of Maize Kernel Among Its Parts.

	In entire grain, lbs.*	In skin, lbs.	In germ, lbs.	In endosperm, lbs.
Water,	24.64	.85	3.01	20.78
Dry matter,	75.36	4.71	7.16	63.49
Components of dry matter:				
Ash,	1.29	.06	.80	.43
Protein,	9.62	.31	1.55	7.76
Fiber,	1.39	.77	.21	.41
Nitrogen-free extract,	59.87	3.50	2.48	53.91
Fat,	3.17	.07	2.12	.98

* Computed by adding the results for the three portions of the grain.

These figures show that despite the imperfect separation of the skin, it contains over half of the entire fiber of the kernel, and very little of the protein, fat and ash. The germ, on the other hand, though it constitutes only one-tenth of the kernel, contains two-thirds of the fat and ash, and nearly one-sixth of the protein. The endosperm, forming nearly seven-eighths of the entire kernel, contains about four-fifths of the protein, one-third of the ash, fiber and fat, and nine-tenths of the starch and related matters.

The consequences of these differences in composition of the several parts of the kernel are seen in the make-up of the numerous by-products of corn that are left when a portion of the kernel is abstracted for the manufacture of starch, glucose or some of the numerous breakfast foods that are made from corn.

Shelled Corn.

Among the samples submitted for examination were the following lots of shelled corn:

No.	Manufacturer.	Price per ton.
161	Clapper Bros., Martinsburg, Pa.,	$21 00
186	R. Lee Walker, Duncansville, Pa.,	16 79

Their percentage composition was as follows:

Number.	Moisture.	Protein.	Fat.
161,	10.14	9.19	4.48
186,	10.76	9.13	4.14

These percentages are well within the range for dent corn, though not up to the average.

Cracked Corn.

A sample sold under the name "Fine Cracked Corn for Young Chicks," selling at $19.00 per ton, was taken from the manufacturers, Snyder Bros., Dalton, Pa. Its composition is as follows:

Number.	Moisture.	Protein.	Fat.
143,	9.95	9.00	2.47

The proportion of fat is lower than any recorded in Jenkins and Winton's tables of American analyses.

Corn Chop and Meal.

A considerable series of samples have been examined representing both the coarser "chops" and the more finely ground "meal" sold in the State. Among the samples labeled as "corn chop" are a number, manufactured by the Pittsburg Milling Co., that, from their large proportion of fat, are classed more properly as "hominy chops." Their analyses are therefore presented with those of the latter class of materials.

The sources of the several samples are as follows:

Corn Chop.

No.	Manufacturer.	Dealer.	Price per ton.
175	Bare Milling Co., Roaring Spring, Pa.,	Bare Milling Co.,	....
274	Levi Brant, Harrisburg, Pa.,	Levi Brant,	$20 00
200	Central Elevator Co., Pittsburg, Pa.,	McClelland & Siple,	22 00
232	Central Elevator Co., Pittsburg, Pa.,	C. Beckert,	18 50
188	Clapper Bros., Martinsburg, Pa.,	Clapper Bros.,	20 00
41	H. F. Dry, Oley, Pa.,	A. N. Kissinger & Son., Reading, Pa.,	25 00
62	H. H. Gring, Mohnsville, Pa.,	H. H. Gring,	21 00
57	David Hartz, Morgantown, Pa.,	David Hartz,	19 00
158	H. W. Lecrone, Duncansville, Pa.,	H. W. Lecrone,	19 00
189	C. E. Lingafelt, Hollidaysburg, Pa.,	C. E. Lingafelt,	19 00
206	R. S. McCague & Co., Pittsburg, Pa.,	W. W. Cleland,	20 00
19	McDermott, Wertz & Co., Johnstown, Pa.,	Gustave Bostert, Johnstown, Pa.,	19 00
173	F. & I. Mentzer, Frankstown, Pa.,	F. & I. Mentzer,	22 00
210	Pittsburg Milling Co., Pittsburg, Pa.,	C. Kelner, Allegheny, Pa.,	20 00
157	R. Lee Walker, Duncansville, Pa.,	R. Lee Walker,	19 00
172	G. P. Wilt, Blair's Gap Mills, Duncansville, Pa.	G. P. Wilt,	19 00

Corn Meal.

No.	Manufacturer.	Dealer.	Price per ton.
207	Altman Mills, Toledo, O.,	Peter Bock, Pittsburg,	$21 00
245	D. H. Beebe, Corry, Pa.,	D. H. Beebe,	19 00
67	Eclipse Milling Co., Brownsville, Pa.,	Eclipse Milling Co.,	10 00
70	Gaddis & Co., Uniontown, Pa.,	M. H. Clarke, Uniontown, Pa.,	20 00
169	H. Mulhollen,	H. Mulhollen,	....
205	Pittsburg Milling Co., Pittsburg, Pa.,	M. E. Coleman, East End, Pittsburg Pa.,	20 00
231	Pittsburg Milling Co., Pittsburg, Pa.,	Chas. Friel, Pittsburg, Pa.,	22 00
150	C. H. Sears, Clark's Summit, Pa.,	C. H. Sears,	19 00
47	Geo. S. Snyder, Hatfield, Pa.,	A. N. Kissinger & Son, Reading, Pa.,	26 00
139	Snyder Bros., Dalton, Pa.,	Snyder Bros.,	19 00
208	Toledo Grain & Milling Co., Toledo, O.,	M. E. Coleman, Pittsburg, Pa.,	21 00
28	C. W. Walter, Walters, Pa.,	C. W. Walter,	18 00
77	Warner Bros., Grant Station, N. Y.,	Warner Bros.,	21 00
82	Warren Mills, Warren, Pa.,	Warren Mills,	19 00
129	Weston Mill Co., Scranton, Pa.,	Weston Mill Co.,	19 00

Percentage Composition of Corn Chops and Meals.

No.	Description.	Moisture.	Protein.	Fat.
	Corn Chop.			
175	Pure corn chop,	10.70	9.19	3.97
274	Corn chop,	11.11	9.31	3.92
200	Corn chop (coarse meal),	9.99	9.44	4.35
232	Corn meal "chop",	9.90	9.63	3.78
188	Pure corn chop,	10.00	7.50	4.27
41	Clear corn chop,	11.20	9.13	4.39
62	Pure corn chop,	10.98	8.44	3.98
57	Pure corn chop,	11.23	8.31	4.92
158	Pure corn chop,	10.29	9.06	3.89
189	Corn chop,	10.18	9.50	4.00
206	Corn meal "chop",	10.69	8.81	3.73
19	Corn chop,	11.50	9.56	3.98
173	Pure corn chop,	10.23	9.13	4.24
210	Yellow corn "meal chop",	10.50	8.88	3.41
157	Corn chop,	10.23	9.69	4.18
172	Corn chop,	10.52	9 44	4.18
	Range,	9.90-11.50	7.50-9.69	3.41-4.39
	Average,	**10.58**	**9.06**	**4.03**
	Corn Meal.			
207	Corn meal,	10.04	8.00	3.85
245	Corn meal,	10.00	9.31	3.89
67	Corn meal,	10.73	8.81	3.58
70	Corn meal,	11.43	7.94	3.05
169	Corn meal (not descriptively named),	10.81	9.31	4.26
205*	Corn meal, white,	7.77	10.75	8.39
231	Corn meal,	9.12	10.13	5.04
150	Corn meal,	10.39	9.00	4.09
47†	Granulated corn meal,	11.75	8.38	.97
139	Corn meal,	9.90	9.38	4.05
208	Corn meal, yellow,	9.77	7.75	3.18
28	Corn meal,	11.40	8.56	3.99
77	Corn meal,	12.15	8.69	3.82
82	Corn meal,	12.14	9.31	3.76
129	Corn meal,	9.81	9.13	3.95
	Range, omitting Nos. 47 and 205,	9.12-12.15	7.75-10.13	3.05-5.04
	Average, omitting Nos. 47 and 205,	**10.59**	**8.87**	**4.66**

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* Evidently a hominy meal.

† Oil deficient.

Excluding Nos. 205 and 47 as special products, evidently not produced by a simple milling process, we may compare the composition found for the Pennsylvania samples, with those obtained elsewhere:

Composition of Corn Crop in Different States. (per cent.)

	Number of analyses.	Protein.			Fat.		
		Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
Pennsylvania samples:							
Chop,	15	9.69	7.50	9.06	4.39	3.41	4.03
Meal,	12	10.13	7.75	8.83	5.04	3.05	4.19
United States:							
Analysis completed by Jenkins and Winton (1892)—Meal,	77	13.9	7.1	9.2	5.1	2.0	3.8
New England States (1898-9),	17	10.8	8.6	9.5	4.7	2.7	4.0

All samples fall within the established limits of variation. There is a general tendency for the corn meals to run low in protein.

No. 205 belongs rather to the class of "hominy chops," as its high percentage of fat indicates.

A microscopic examination shows:

No. 157. Contains some portions of cob, but possibly no more than might be due to careless cleaning after shelling.

No. 172. Contains cob, like No. 157, and also contains a small, but considerable proportion of oat hulls. Oat kernels were not found.

No. 231. Contains a few whole oats, evidently an accidental mixture.

Corn-and-Cob Chops.

The chopping of the cob with the kernel results in the production of a very different food, because of the highly different composition of the cob as well as because of its bulkiness. Eighteen American analyses of the cob compiled by Jenkins and Winton, exhibit the following percentages:

	Mean.	Highest.	Lowest.
Moisture,	10.7	24.8	7.2
Ash,	1.4	2.7	0.7
Protein,	2.4	3.7	1.2
Fiber,	30.1	38.3	18.2
Nitrogen-free extract,	54.9	66.7	43.8
Fat,	0.5	0.9	0.1
	100.00	....	....

Not only is the protein barely one-fourth as abundant as in the kernel and the fat but one-tenth as much, but the fiber is fourteen times as great in amount; moreover, the nitrogen-free extract of the cob, instead of being composed, like that of the grain, chiefly of starch, is largely made up of less valuable pentosans.

The proportion of cob to kernel in well developed dent corn varies little from 14 pounds in 70 pounds of ears, or one part of cob to four of shelled corn.

Figuring on this proportion and upon the basis of the average composition of dent kernel and of cob given above, the mean composition of corn-and-cob meal should be:

	Per cent.
Moisture,	10.6
Ash,	1.5
Protein,	8.7
Fiber,	7.8
Nitrogen-free extract,	67.3
Fat,	4.1
	100.00

Six samples of this material were submitted for analysis, taken from the following sources:

No.	Manufacturer.	Dealer.	Price per ton.
53	M. C. Dietrich, Kempton, Pa.,	M. C. Dietrich,	$14 50
185	H. W. Lecrone, Duncansville, Pa.,	H. W. Lecrone,	16 00
191	C. E. Lingafelt, Hollidaysburg, Pa.,	C. E. Lingafelt,	17 00
151	F. & I. Mentzer, Frankstown, Pa.,	F. & I. Mentzer,	17 00
64	John H. Schmehl, Scarlett's Mills,	John H. Schmehl,	18 00
35	C. W. Walter, Walter's, Pa.,	C. W. Walter,	15 00

Percentage Composition of Corn-and-Cob Chops.

No	Description.	Moisture.	Protein.	Fat.
53	Corn-and-cob chop,	10.77	7.56	3.52
185	Ear corn chop,	10.06	7.81	3.44
191	Corn-cob and all,	10.39	7.81	3.48
151	Two-thirds ear, one-third shelled corn chop,	10.62	8.50	3.31
64	Corn-cob chop,	11.15	6.88	3.31
35	Cob feed,	11.44	6.94	3.45
	Range,	10.06-11.44	6.88-8.50	3.31-3.52
	Average,	10.74	7.58	3.42
	Average, omitting No. 151,	**10.76**	**7.40**	**3.44**

New England Control reports do not discuss this feeding-stuff. Jenkins and Winton compiled the results of seven analyses made prior to 1892. They compare with the foregoing, omitting No. 151, as follows:

	Number of samples.	Protein, Per cent.			Fat, Per cent.		
		Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
Pennsylvania,	5	7.81	6.88	7.40	3.52	3.31	3.44
United States,	7	12.2	5.8	8.5	4.7	2.5	3.5

These analyses are therefore about normal, though, as in case of the corn meal, the tendency is toward a low protein average.

No. 151 is found, upon examination, to contain a large proportion of oat hulls, which, selling under the name given to this sample, constitutes a serious adulteration notwithstanding the fact that the material contains more protein than the other corn-and-cob meals.

Gluten, Gluten Meal and Gluten Feed.

These are by-products from the manufacture of starch and glucose from corn.*

The process is essentially as follows: The corn is soaked for some hours in a weak solution of sulfurous acid. In the resulting softened condition it is ground, the ground products being carried off in the water. The germ or chit floats on the surface and is gathered by skimming. The starch and gluten are carried off in the water and deposit separately because the starch is heavier, the hull having been previously separated by passing the water through sieves. The starch thus separated is the main product. The other materials are deprived of most of their moisture by pressure and then kiln-dried.

The gluten meal is sometimes sold by itself; often in combination with the husk or bran, and sometimes the "chit" or germ, as "gluten feed." The composition of these by-products is subject to a further variation from the fact that, in some factories, the corn oil is partially removed. When the germ is kept apart, it is frequently deprived of a large fraction of its oil by hydraulic pressure; the press-cake is then sold as germ oil cake. The bran also is often sold as a separate food-stuff.

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* The so-called "Atlantic gluten meal" is an exception, being derived instead as a by-product of the manufacture of wheat-starch. It contains 48.9 per cent. of protein and 7.9 per cent. of fat.

Owing to the large amounts of water used in these separations, the several products are exhausted of a large portion of their soluble mineral water, chiefly phosphate of potassium.

No samples of genuine "gluten meal,"* were submitted, though several samples of gluten feed were received under the label "gluten meal." The samples of gluten feed received were:

No.	Manufacturer.	Dealer.	Price per ton.
149	American Glucose Co., Chicago,	Snyder Bros., Dalton, Pa.,	$18 50
116	Buffalo Sugar Refining Co., Buffalo, N Y.,	M. A. Kirby,	16 00
240	Buffalo Sugar Refining Co., Buffalo, N.Y.,	R. S. McCague, Pittsburg, Pa.,	18 00
31	Glucose Sugar Refining Co., Peoria, Ill.,	C. W. Walter, Walters, Pa.,	18 00
43	Glucose Sugar Refining Co., Chicago., Ill.	A. N. Kissinger & Son, Reading, Pa.,	20 00
282	Glucose Sugar Refining Co., Chicago, Ill.	John B. Curry, Swatara Sta., Pa.,	18 50
107	Glucose Sugar Refining Co., Chicago, Ill.	Morris Briggs, Woodbourne, Pa.,	19 00
55	Glucose Sugar Refining Co., Rockford, Ill.	Mahlon C. Dietrich,	18 00
81		Warren Mills Co., Warren, Pa.,	18 00
118		Trenton Milling Co., Morrisville, Pa.,	20 00
137		C. H. Sears, Clark's Summit,	19 00
243		Crouch Bros., Erie, Pa.,	17 00

Percentage Composition of Gluten Feeds.

No.	Description.	Moisture.	Protein.	Fat.
149	Gluten feed,	8.67	24.31	3.44
116	Coarse gluten,	7.86	13.88	3.04
240	Gluten feed,	8.55	25.75	2.43
31	Gluten feed,	9.11	25.19	3.16
43	Gluten feed,	9.84	26.56	2.19
282	Buffalo gluten feed,	8.46	26.75	2.53
107	Gluten,	8.08	26.50	2.41
55	Gluten feed,	9 15	24.00	3.53
81	Gluten feed,	9.08	27.00	2.76
118	Gluten,	8.48	25.19	3.55
137	Gluten feed,	9.14	25.94	2.68
243	Gluten feed,	8.19	25.75	2.38
	Range,	7.86-9.84	13.88-27.00	2.19-3.55
	Average,	**9.72**	**24.72**	**2.84**

The average composition of gluten meal derived from corn is stated by Jenkins and Winton as:

	Per cent.
Water,	9.6
Ash,	0.7
Protein,	29.4
Fiber,	1.6
Nitrogen-free extract,	52.4
Fat,	6.3
	100.0

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* Later analyses show an average of 36.7 per cent. protein and 2.7 per cent. fat for Chicago gluten meal, and 34.1 per cent. protein and 3.2 per cent. fat for "cream gluten."

There was no microscopic evidence of adulteration of these materials.

It is interesting to note that "gluten meal" is not included among the samples secured and that "gluten feed" is in quite a number of cases described by the generic name "gluten." Yet among the samples recently analyzed by the New England States, there were 118 gluten meals and 79 gluten feeds.

On considering the composition of No. 116, it is clear that the name "coarse gluten" is a misbrand. The material corresponds better to "fancy corn bran" which is sold by the Glucose Sugar Refining Company in New York State under a guaranty of 13.5 per cent. protein and 3 per cent. fat.

There are a number of brands of gluten feed upon the market. The general tendency of business consolidation has been toward a greater uniformity in production, certainly toward a diminution in the number of brand names for the same general product.

Since the names secured by the sampling agents do not clearly indicate the brand names of these goods, our comparisons will be confined to the gluten feeds whose manufacturers are named, practically all coming from the Glucose Sugar Refining Company's factories.

Comparative Composition of Gluten Feeds in Different States.

	Number of analyses.	Protein, Per cent.			Fat, Per cent.		
		Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
Pennsylvania:							
All analyses (except 116), ...	11	27.00	24.00	25.71	3.55	2.19	2.64
Glucose Sugar Refining Company's brands, ...	7	26.75	24.00	25.58	3.53	2.19	2.81
New England, 1898-99:							
Buffalo gluten feed, ...	34	29.6	25.3	27.5	4.7	2.3	3.1
Diamond gluten feed, ...	30	30.1	20.3	23.6	4.0	2.0	3.0
New York, 1899:							
Buffalo gluten feed, ...	6	27.63	21.31	26.10	4.67	3.38	3.71
Diamond gluten feed, ...	2	20.56	20.00	20.28	5.21	3.40	4.30
All analyses, 1900, ...	21	....	....	23.75	....	....	4.55
Buffalo gluten feed, 1900, ...	3	27.0	24.1	25.9	5.0	2.9	3.9
Diamond gluten feed, 1900, ..	3	25.9	24.4	25.3	3.6	2.8	3.2

The composition guaranteed in New York for the year 1900 for the Buffalo, Diamond, Davenport and Marshalton brands was protein 27 per cent., fat 3.3 per cent.

The gluten feed sold in Pennsylvania seems to be chiefly of the Buffalo brand. Judging from the results of analysis in neighboring

States having food controls, the goods sold in Pennsylvania is somewhat inferior, on the average, to those sold where the law requires a guaranty of composition and provides the means for chemical examination of the foods.

Germ Oil Cake.

A single sample of "germ oil cake," manufactured by the Glucose Sugar Refining Co., of Chicago, and purchased from W. K. Heebner, West Point, Pa., at $22.50 per ton, shows the following percentage composition:

	Per cent.
Moisture,	9.67
Protein,	22.56
Fat,	9.77

By the removal of three-fourths of its moisture and of two-thirds of its fat by drying and pressing, a germ having the original composition shown in Voorhees's analysis, would yield a cake containing 11.71 per cent. moisture, 23.94 per cent. protein and 10.99 per cent. fat, quantities a little higher than those shown in the market sample; but the corn examined by Voorhees was exceptionally rich in protein.

Under the name "germ oil meal" the Glucose Sugar Refining Company offers a feeding stuff guaranteed to contain 25 per cent. protein and 10.5 per cent. fat. The foregoing sample falls considerably under this guarantee in both constituents.

Corn Bran.

Three samples of this material were submitted:

No.	Manufacturer.	Dealer.	Price per ton.
101	Marfield & Co., Chillicothe, O.,	W. K. Heebner, West Point, Pa.,	$16 00
98	———, Nashville, Tenn.,	W. K. Heebner, West Point, Pa.,	18 00
88	———, Nashville, Tenn.,	Simpson Bros., Norristown, Pa.,	18 00

The percentage composition of these samples was as follows:

No.	Description.	Moisture.	Protein.	Fat.
101	White corn bran, fine,	11.42	9.44	6.88
98	White corn bran, coarse,	8.85	11.50	12.07
88	White corn bran,	9.73	11.31	12.17
	Range,	8.85-11.42	9.44-11.50	6.88-12.17
	Average,	**10.00**	**10.75**	**10.37**

There are few data available for comparison with these analyses. The following may suffice:

	Number of analyses.	Protein, Per cent.			Fat, Per cent.		
		Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
New Jersey, 1894,	3	11.83	10.16	10.97	8.32	3.75	6.64
New York, 1900,	1	11.9	9.2	10.05	7.9	4.3	6.1
Pennsylvania,	3	11.50	9.44	10.75	12.17	6.88	10.37

The Pennsylvania samples are marked by the possession, in two cases out of three, of an exceptionally high proportion of corn-oil. In all these cases, the fat or oil, and the protein also, so far exceeds that found by Voorhees in the true skin or bran, that it is clear a very considerable proportion of the germ must remain with the true bran in the goods marketed under the latter name.

Sugar Feed.

A single sample of this name, No. 90, described as manufactured in Chicago, Ill., and sold by Simpson Bros., of Norristown, Pa., at $16 per ton, was received, with the accompanying statement that dairymen feeding it, believe it is giving good results.

The analysis is as follows:

	Per cent.
Moisture,	9.76
Protein,	7.94
Fat,	7.40
Reducing sugar, calculated as dextrose,	.90

Optical examination shows this to be a coarse corn-bran, from white corn, with no considerable quantity of finely divided material; the microscope shows no foreign starches present. The food is, as both the analysis and optical examinations show, corn bran.

Sugar Corn Feed.

A single sample of this product was submitted, described as manufactured by The Glucose Sugar Refining Co., Chicago, Ill., and sold by The Sims Co., Erie, Pa., at $14.00 per ton. A guaranty of 10.07 per cent. protein and 3.90 per cent. fat, accompanied the sample.

The analysis gave the following figures:

	Per cent.
Moisture,	8.41
Protein,	12.81
Fat,	2.72

A sample sold under this brand name, made by the same company, and guaranteed to contain 13.5 per cent. protein and 3 per cent. fat, was analyzed by the New York Experiment Station (Bulletin 176, p. 29) with the following results:

	Per cent.
Protein,	11.8
Fat,	5.8

Other samples of feeding stuffs sold under this name, but concerning whose manufacturer no information is given, have been analyzed recently as follows:

Moisture.	Protein.	Fat.	Laboratory.
....	12.3	5.2	N. Y. Station, B. 176, p. 29.
....	8.6	7.9	N. Y. Station, B. 176, p. 29.
9.96	11.25	5.12	N. Y. Station, B. 166, p. 264.*
....	10.00	4.57	R. I. Sta., B. 63, p. 100.

*This sample contained 11.91 per cent of crude fiber.

Comparison of these analyses with that of corn bran show a quite close resemblance between this feeding-stuff and the bran in their richness in protein and fiber, though the fat is considerably more abundant on the average in the bran. Furthermore, the feed does not seem to be very uniform in composition, quite marked variations from guaranty being observed in both instances where a guaranty was given.

Hominy Chop.

Under this name and the terms "white meal," "hominy feed" and "Baltimore meal," is sold a by-product from the manufacture of hominy. In making the hominy, the hard, inner portion of the grain is removed, while the hull, germ and portions of the starchy part of the kernel are combined to form the cattle food.

Two samples were submitted:

No	Manufacturer.	Dealer.	Price per ton.
145	Weston Mill Co., Scranton, Pa., ...	Weston Mill Co., ...	$20 00
250	....	Crouch Bros., Erie, Pa., ...	17 00

Analysis (per cent.)

No.	Description.	Moisture.	Protein.	Fat.
145	Hominy chop,	8.44	11.25	9.78
250	Hominy,	8.99	10.25	7.40

The Connecticut Station (B. 130, p. 33), gives a summary of eight complete analyses of these materials:

	Per cent.
Moisture,	8.43
Ash,	2.60
Protein,	11.35
Fiber,	4.92
Nitrogen-free extract,	64.64
Fat,	8.06

So that, having about six or seven per cent. less fiber than corn bran and about five per cent. more starchy matter, the hominy chops more nearly resemble entire corn meal in composition; practically it differs from the corn itself only in having a few per cent. less starch and relatively more of the other valuable components.

From their composition it is evident that a number of samples whose brand name indicates that they may be simply ordinary corn chop, belong rather among the hominy chops. They are the following:

No.	Manufacturer.	Dealer.	Price per ton.
204	Pittsburg Milling Co., Pittsburg, Pa.,	Brown & Co., Pittsburg. Pa.,	$20 00
202	Pittsburg Milling Co.. Pittsburg, Pa.,	Wm. Fisher, Pittsburg, Pa.,	18 00
224	Pittsburg Milling Co., Pittsburg, Pa.,	D. Whitmyer, Allegheny, Pa.,	18 00
225	Pittsburg Milling Co., Pittsburg, Pa.,	C. Kelner, Allegheny, Pa.,	19 00
219	Pittsburg Milling Co., Pittsburg, Pa.,	Wm. Fisher, Pittsburg, Pa.,	20 00
238	Pittsburg Milling Co., Pittsburg, Pa.,	D. Whitmyer, Allegheny, Pa.,	19 00

Their percentage composition is as follows:

No.	Description.	Moisture.	Protein.	Fat.
204	Corn chop,	7.96	11.19	9.23
202	White corn chop,	8.65	11.00	9.21
224	White corn chop,	8.19	10.75	8.93
225	White corn meal chop,	8.35	11.19	8.97
219	Yellow corn chop,	9.00	10.69	8.54
238	Yellow corn chop,	8.32	11.50	9.32

The differences in selling price of these goods are not strictly in accordance with their composition.

Microscopic examination of these samples gives the following results:

No. 224. Is coarse ground; contains, in addition to coarse particles of the corn bran, occasional bits of oat hull and quite a little corn cob, though possibly not more than would result from imperfect cleaning of the kernel during the process of shelling.

No. 219. Contains a very noticeable quantity of oat hulls.

No. 238. Like No. 219, is evidently made by blending several materials. Considerable oat hull and more corn cob than a good clean article of corn should yield, are present. The major portion of the corn bran and grain is white, but numerous small yellow particles, either of the pure endosperm, or of its more highly nitrogenous portion, of yellow corn is present.

In composition, at least as regards their richness in protein and fat, these samples do not differ conspicuously from the others of the same group.

Cerealine Feeds.

These are by-products from the manufacture of "cerealine" breakfast foods and are made from white corn exclusively.

The samples submitted are:

No.	Manufacturer.	Dealer.	Price per ton.
99	Cerealine Manufacturing Co., Indianapolis, Ind.	W. K. Heebner, West Point, Pa., ...	$17 00
135	Cerealine Manufacturing Co., Indianapolis, Ind.	C. H. Sears, Clark's Summit, Pa.,....	19 00
94	Cerealine Manufacturing Co., Indianapolis, Ind.	W. K. Heebner, ...	18 00

The percentage composition of the samples is:

No.	Description.	Moisture.	Protein.	Fat.
99	Cerealine Feed, No. 1, ...	8.49	11.75	9.75
135	Cerealine Feed, No. 1, ...	8.99	9.94	7.62
94	Cerealine Feed, No. 2 (?), ...	9.95	25.88	2.69

The composition of Feed No. 1 is similar to that of hominy chop; that of the sample purporting to represent Feed No. 2, resembles gluten feed. No guaranties accompany the descriptions of these feeds, but the guaranties given in New York State during the year 1900 are as follows:

	Protein, per cent.	Fat, per cent.
Cerealine Feed, No. 1,	9.00	5.82
Cerealine Feed, No. 2,	10.31	8.62

A single sample of No. 2 analyzed by the New York Station is in harmony with the guaranty. It seems practically certain therefore that the description of Sample No. 94 is erroneous.

Microscopic examination shows nothing noteworthy.

BUCKWHEAT AND ITS BY-PRODUCTS.

Buckwheat is the source of a number of by-products of the widest difference in feeding value. The grain is composed of a thick, dark brown hull, made up of four layers of different tissue; the grain proper is covered by a thin branny coating, under which lies a layer of aleurone cells, rich in protein like those of the common cereals, and finally, lying within this layer, is found the endosperm from which the flour is made. The milling products, properly classified, are as follows:

1. The flour, including the endosperm with as little as possible of the other layers.
2. The middlings, composed in part of the endosperm and aleurone, layer, and containing a portion of the true seed coat.
3. The bran, composed chiefly of the true seed coat, with small portions of the aleurone layer and endosperm.
4. The hulls.
5. Buckwheat feed composed of hulls and bran or middlings, often with a portion of the hard outer layer of the hull removed.

The general percentage composition of the several principal parts of the grain, as separated by milling, is as follows:

	Flour.	Middlings.	Bran.	Hulls.
Moisture,	14.6	13.2	9.2	8.0
Ash,	1.0	4.8	5.0	2.5
Protein,	6.9	28.9	30.4	5.8
Fiber,	0.3	4.1	4.9	37.7
Nitrogen-free extract,	75.8	41.9	41.9	44.4
Fat,	1.4	7.1	8.6	1.6

That is to say, there is very little difference between the bran and middlings in practice. The hulls are woody and of low digestibility; they possess little feeding value.

Two samples of buckwheat were received for analysis:

No.	Manufacturer.	Dealer.	Price per ton.
128	Snyder Bros., Dalton, Pa., ...	Snyder Bros., ...	$40 00
141	Snyder Bros., Dalton, Pa., ...	Snyder Bros., ...	18 00

Their description and composition are as follows:

No.	Description.	Moisture	Protein.	Fat.	Remarks.
128	Buckwheat flour,.......	11.59	5.88	1.06	Microscopically pure.
140	Buckwheat middlings,.	10.00	31.06	8.77	Contains considerable proportion of hulls.

The flour, No. 128, is exceptionally free from particles of the exterior layers of the grain and is absolutely without foreign admixture. The "middlings" is, properly speaking, "buckwheat feed." Its composition is up to that of average buckwheat middlings, but it contains a considerable proportion of hulls which cannot, by any stretch of courtesy, be allowed sale under the name "bran" or "middlings." This is a case of adulteration with very little of fraud if the goods be sold after examination, because the least experienced buyer, if he were acquainted with the proper meaning of the term middlings, could not fail to note the presence of the coarse hulls.

MIXED FEEDS.

Corn and Oat Feeds.

Properly, these feeding-stuffs should be composed of a mixture of ground corn and ground oats, but very frequently large proportions of the relatively valueless hulls are admixed.

The average percentages of fat in corn and oats are the same, and those of protein are so nearly the same that there is only one-half per cent. more protein in a corn-and-oats chop containing two parts of oats to one of corn, than in a chop made from one part of oats to two of corn. A chop made from equal parts of oats and corn, such as is called "provender" in New England, should contain about 11.1 per cent. of protein and 5.0 per cent. of fat.

The following samples were received:

No.	Manufacturer.	Dealer.	Price per ton.
97	American Cereal Co., Akron, O.,	W. K. Heebner, West Point, Pa.,	$18 00
280	American Cereal Co., Chicago, Ill.,	John B. Curry, Swatara Station, Pa.,	18 00
283	American Cereal Co., Chicago, Ill.,	Cyrus Romberger, Lykens, Pa.,	18 00
252	D. H. Beebe, Corry, Pa.,	D. H. Beebe, Corry, Pa.,	19 00
235	The Central Elevator Co., Pittsburg, Pa.,	L. W. Kartlick, 22 Penn Ave., Pittsburg, Pa.,	18 00
156	Clapper Bros., Martinsburg, Pa.,	Clapper Bros.,	20 00
247	Densmore Bros., Erie, Pa.,	Densmore Bros.,	18 00
42	H. F. Dry, Oley, Pa.,	A. N. Kissinger & Son, Reading, Pa.,	21 00
78	D. H. Grandin, Jamestown, N. Y.,	D. H. Grandin,	23 00
59	David Hartz, Morgantown, Pa.,	David Hartz,	20 00
258	F. L. Heath, Corry, Pa.,	F. L. Heath,	19 00
50	James Heffner, Kutztown, Pa.,	Chas. W. Pennock, Reading, Pa.,	18 00
177	C. E. Lingafelt, Hollidaysburg, Pa.,	C. E. Lingafelt,	19 00
13	McDermott, Wertz & Co., Johnstown, Pa.,	McDermott, Wertz & Co.,	20 00
16	McDermott, Wertz & Co., Johnstown, Pa.,	Gustav Bostert, Johnstown, Pa.,	19 00
23	Toledo Grain and Milling Co., Toledo, O.,	Pennsylvania Traffic Co., Ltd., Johnstown, Pa.,	21 00
214	Toledo Grain and Milling Co., Toledo, O.,	M. E. Coleman, 6114 Centre Avenue, Pittsburg, Pa.,	21 00
181	R. Lee Walker, Duncansville, Pa.,	R. Lee Walker,	20 00
271	(Manufactured near Middletown, Pa.),	S. B. Vance, Middletown, Pa.,	22 00

The percentage composition of these samples is as follows:

No.	Description.	Moisture.	Protein.	Fat.
97	Victor corn and oat feed,	10.33	8.38	3.42
280	Victor corn and oat feed,	9.99	7.88	3.28
283	Victor corn and oat feed,	9.17	7.88	4.07
252	Corn and oat feed,	9.87	9.00	3.72
235	Corn and oats chop,	9.62	9.25	4.26
156	Corn and oats chop,	9.63	8.69	3.97
247	Corn and oats chop,	10.13	8.94	3.52
42	Corn and oats chop,	10.34	8.63	3.95
78	Corn and oats,	11.44	8.44	3.58
59	Corn and oats (one-third corn, two thirds oats),	12.10	9.88	4.17
258	Oats and corn chop,	9.94	9.63	4.19
50	Corn and oats,	11.12	9.25	4.05
177	Corn and oats,	10.34	9.31	3.76
13	Corn and oats,	12.26	9.19	3.92
16	Corn and oats,	11.66	9.31	4.10
23	Corn and oats,	11.53	8.00	3.41
214	Corn and oats chop,	10.20	7.81	2.97
181	Corn and oats,	10.17	9.44	3.58
152	Corn and oats chop,	10.07	9.00	4.08
271	Corn and oats chop,	10.28	8.56	3.44
	Range,	9.17-12.26	7.81-9.88	2.97-4.26
	Average,	**10.51**	**8.82**	**4.27**

Not one of these feeds reaches, in either constituent, the average percentage for unadulterated corn and oats. On the other hand, both grains are sufficiently variable in composition to make it possible that any one of these feeds might have been made by mixing exceptionally poor lots of the two grains. Admitting this as a possibility in individual cases, it is nevertheless safe to say, upon the basis of these analyses, that there is almost no pure corn-and-oats feed on sale in the State and that the practice of diluting by admixture of oat hulls is well nigh universal. Assuming average composition for the three materials, a mixture of 58 parts corn, 31 parts oats hulls and 11 parts oats would contain about 8.8 per cent. of protein and 3.7 per cent. of fat. When it is considered that small quantities of corn cob are found in many of these samples, as in Nos. 97, 283, 259 and 214, whether purposely added or remaining after an imperfect cleaning of the corn after shelling, the possibilities of variation are more clearly perceived.

When it is seen that the average composition of these mixtures is about the same, or a little inferior in fat content, to that of the corn meal, that a very considerable proportion of the corn and oat feeds is composed of oat hulls whose nitrogen-free extract is much less digestible than corn, and yet that the average price paid for these feeds is about $19.60, while that paid for corn chops and meals is $19.35, the advantage of economy is seen to lie with the unmixed corn.

Of the brands examined, Victor Corn and Oat Feed is the only one analyzed in other States. The comparative data for this brand are:

	Number of analyses.	Protein, Per cent.			Fat, Per cent.		
		Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
Victor corn and oat feed:							
Pennsylvania,	2	7.88	7.88	7.88	4.07	3.28	3.68
New York, 1900,	4	8.7	7.1	8.1	4.6	2.9	4.78
New England, 1898-9,	26	11.3	9.5	9.2	5.1	2.9	3.9
All brands:							
Pennsylvania,	20	9.88	7.81	8.82	4.26	2.97	4.27
New York, 1899-1900,	17	9.37	6.8	8.03	4.6	1.6	3.22
New England, 1898-9,	43	12.3	8.2	9.3	7.1	2.7	3.8

In New York, 1900, the Victor brand was guaranteed to contain 8.23 per cent. protein and 3.00 per cent. fat. The New York analyses are up to this guarantee. A careful consideration of the above data shows that Pennsylvania receives goods of this class inferior, on the average, to those of New York, where the selling price is somewhat less, and that in both these States this class of goods is less rich than in New England, where systematic inspection of cattle foods has been longer practiced.

Closely related to the foregoing feeds are two other samples;

No. 80. Corn and oats hulls; made and sold by the Warren Mills Co., Warren, Pa., at $19.00 per ton.

No. 192. Corn and cob meal and oats; made and sold by Clapper Bros., Martinsburg, Pa., price not given.

The percentage composition of these goods was:

Number.	Moisture.	Protein.	Fat.
80,	11.62	8.63	3.12
192,	9.52	9.13	3.67

That is, these brands do not differ in composition from others sold under more misleading names.

Though sold under different names, the following feeds are also closely related to the foregoing:

No.	Manufacturer.	Dealer.	Price per ton.
124	Weston Mill Co., Scranton, Pa.,	Weston Mill Co.,	$21 00
127	Weston Mill Co., Scranton, Pa.,	Weston Mill Co.,	19 00
153			

Analysis gave the following results (per cent.):

No.	Description.	Moisture.	Protein.	Fat.
124	Best mixed feed,	8.61	9.38	4.09
127	Regular mixed feed,	9.76	9.81	4.58
153	No accompanying description,	10.31	9.25	4.01

No. 124 shows, when optically examined, a larger proportion of corn chop than No. 127, and some excess of oat hulls. No. 153 has a preponderance of corn.

Other Mixed Stock Feeds.

In addition to the foregoing, a number of stock foods made of other combinations of materials have been received:

No	Manufacturer.	Dealer.	Price per ton.
155		B. Cohn, Altoona, Pa.,	
168		H. Mulhollen,	
10		I. L. Hockensmith,	$18 00
48	American Cereal Co., Chicago, Ill.,	Israel S. Fry, Reading, Pa.,	17 00
267	American Cereal Co., Chicago, Ill.,	John B. Curry, Swatara Sta.,	19 00
162	T. M. Biddle, Altoona, Pa.,	T. M. Biddle,	
167	R. L. Walker, Duncansville,	R. L. Walker,	20 00
174	J. S. Brown & Son, Loysburg,	J. S. Brown & Son,	16 00
198	Bare Milling Co., Roaring Spring,	Bare Milling Co.,	
163	P. W. Post, Altoona,	P. W. Post,	25 00
184	R. Lee Walker, Duncansville,	R. Lee Walker,	22 00

No.	Manufacturer.	Dealer.	Price per ton.
178		(Sent by H. L. Harvey),	
11		James Reeder,	16 00
49	James Heffner, Kutztown, Pa.,	Chas. W. Pennock, Reading,	20 00
38	Mann & Allshouse, Easton,	Mann & Allshouse,	22 00
37	Mann & Allshouse, Easton,	Mann & Allshouse,	20 00
272	Levi Brant, Harrisburg, Pa.,	Levi Brant,	23 00
170	Clapper Bros., Martinsburg,	Clapper Bros.,	22 00
194	Clapper Bros., Martinsburg,	Clapper Bros.,	24 00
52	M. C. Dietrich, Kempton, Pa.,	M. C. Dietrich,	22 00
63	H. H. Gring, Mohrsville,	H. H. Gring,	22 00
160	F. & I. Mentzer, Frankstown, Pa.,	F. & I. Mentzer,	20 00
182	G. W. Mock, Rodman's Mills, Pa.,	G. W. Mock,	23 00
65	John H. Schmehl, Scarlets Mill, Pa.,	J. H. Schmehl,	20 00
36	C. W. Walter, Walters, Pa.,	C. W. Walter,	22 00
39	C. W. Walter, Walters, Pa.,	C. W. Walter,	18 00
21	American Cereal Co., Chicago, Ill.,	John Thomas & Son, Johnstown, Pa.,	20 00
68	American Cereal Co., Akron, O.,	M. H. Clark, Uniontown, Pa.,	20 00
26	Toledo Grain and Milling Co., Toledo, Ohio.	Pennsylvania Traffic Co., Ltd., Johnstown,	21 00
122	Snyder Bros., Dalton, Pa.,	Snyder Bros.,	19 00
84	H. O. Company, Buffalo, N. Y.,	Simpson Bros., Norristown, Pa.,	22 50
85	H. O. Company, Buffalo, N. Y.,	Simpson Bros., Norristown, Pa.,	22 50
112	H. O. Company, Buffalo, N. Y.,	Frank H. Duffield, Langhorne,	20 00
115	H. O. Company, Buffalo, N. Y.,	Frank H. Duffield, Langhorne,	20 00
140	Brooks & Pennock, Philadelphia,	Snyder Bros., Dalton, Pa.,	18 50

The results of chemical and microscopical examination are given below. Under the heading "description" are stated the names under which the goods were sold.

Other Mixed Stock Foods.

Number.	Description.	Moisture, per cent.	Protein, per cent.	Fat, per cent.	Remarks.
	Wheat and Oats.				
155	No description,	9.47	14.94	3.90	
168	No description,	9.37	13.31	6.35	
10	Quaker dairy feed,	8.40	10.94	4.73	Contains white corn; oat hulls.
48	Quaker dairy feed,	8.72	12.88	2.94	No corn found.
267	Quaker dairy feed,	8.05	9.00	2.82	Wheat dust abundant.
	Range,	8.05-9.47	9.00-14.94	2.82-6.35	
	Average,	**8.80**	**12.23**	**4.15**	
	Wheat and Corn.				
162	Mixed feed,	10.19	8.69	3.77	Chiefly corn.
167	Corn and middlings,	10.13	12.88	4.30	A few oats present.
174	Mixed feed,	9.98	11.19	3.64	Chiefly bran with corn meal.
	Range,	9.98-10.19	8.69-11.19	3.64-4.30	
	Average,	**10.60**	**10.92**	**3.90**	
	Rye and Oats.				
198	Rye and oats,	9.61	11.13	4.49	Contains yellow corn.
163	Rye and oats chop, one-half each,	10.22	10.31	2.53	
184	Rye and oats,	9.22	9.63	2.89	
178	Rye and oats,	10.22	13.63	3.05	Chiefly middlings with a little oats.
11	Rye and oats,	9.42	10.44	3.22	Hulls abundant.
	Range,	9.22-10.22	9.63-13.63	2.53-4.49	
	Average,	**9.74**	**11.03**	**3.24**	
	Rye and Corn.				
49	Corn and rye,	11.19	11.31	3.28	Rye middlings and yellow corn.
38	Mixed feed (rye and corn),	....	8.81	3.60	Contains little rye bran.
37	Mixed feed for horses (rye middlings and corn),	10.58	10.44	3.52	Considerable bran present.
	Range,	10.58-11.19	8.81-11.31	3.28-3.60	
	Average,	**10.97**	**10.19**	**3.47**	

Number.	Description.	Moisture, per cent.	Protein, per cent.	Fat, per cent.	Remarks.
	Corn, Oats and Rye.				
272	Corn and oats and rye,	10.51	10.00	3.01	
170	Rye, corn and oats chop,	9.70	10.88	4.99	Proportion of oats small.
394	Rye, corn and oats chop,	9.16	11.56	2.92	Proportion of oats small.
52	Corn, rye and oats,	10.81	9.13	2.78	Rye predominant.
63	Corn, oats and rye chop,	9.57	9.00	3.55	Some cob present.
160	Rye mixed chop,	9.27	11.13	3.33	Large proportion of oats.
182	Rye, corn and oats chop,	9.42	9.38	3.42	Small proportion of corn.
65	Corn, oats and rye chop,	11.12	9.13	3.40	Proportion of hulls large.
36	Mixed feed No. 1, rye, corn and oats,	10.45	9.31	3.12	
	Range,	9.16-11.12	9.00-11.56	2.78-4.99	
	Average,	**10.00**	**9.95**	**3.40**	
	Corn-and-Cob Meal, Oats and Rye.				
39	Ear corn, rye and oats,	9.48	8.94	3.27	Particles of cob not abnormal in quantity.
	Corn, Oats and Barley.				
21	Corn, oats and barley,	7.30	10.63	4.37	
68	Corn, oats and barley,	8.07	10.31	4.76	
26	Corn, oats and barley,	11.09	7.38	2.96	Large proportion of hulls.
	Range,	7.30-11.09	7.38-10.63	2.96-4.76	
	Average,	**8.82**	**9.44**	**4.03**	
	Corn, Oats and Wheat.				
122	Corn, oats and bran feed,	9.89	9.13	3.55	Some cob present; oat hulls abundant; bran not prominent.
	H. O. Feeds.				
85	H. O. dairy feed,	8.93	16.56	3.22	Oat hulls prominent; corn, wheat and cotton-seed meal.
112	H. O. dairy feed,	9.39	16.88	3.55	
	Average,	**9.16**	**16.72**	**3.39**	
84	H. O. horse feed,	9.78	11.06	3.53	Oat hulls prominent; cracked corn, wheat middlings and a little linseed meal.
115	H. O. horse feed,	9.08	10.88	2.99	
	Average,	**9.43**	**10.97**	**3.26**	
14	Sucrene dairy feed,	9.32	14.00	2.43	Reducing sugars, 6.31 per cent. roasted corn, oat hulls and linseed detected.

Assuming that the mixtures named should be made up from the unseparated products from the milling of the whole grains, that the grains are of average composition and that they enter in equal proportion into the mixtures, their percentage composition would be as follows:

Mixture.	Moisture.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
Wheat and oats,	10.7	2.4	11.8	5.7	65.8	3.6
Wheat and corn,	10.5	1.7	11.1	2.0	71.1	3.6
Rye and oats,	11.3	2.4	11.2	5.6	66.1	3.4
Rye and corn,	11.1	1.7	10.4	2.0	71.4	3.4
Corn, oats and rye,	11.1	2.1	10.9	4.5	67.5	3.9
Corn-and-cob meal, oats and rye,	12.6	2.1	10.3	5.9	65.7	3.4
Corn, oats and barley,	10.8	2.3	11.5	4.8	66.7	3.9
Corn, oats and wheat,	10.7	2.1	11.3	4.5	67.4	4.0
Corn, oats and wheat bran,	11.2	3.4	12.5	6.9	61.3	4.7

Variations in the proportions of the several grains will produce some variation in the products, but it is interesting to observe how slight the differences are between the percentages of protein and fat in the foregoing mixtures.

Comparison of the data presented in the foregoing table and the analytical results from the examination of the mixed stock feeds will at once reveal many cases of abnormal composition, due in a large proportion of cases to the use of oat hulls as an admixture, in some instance, to the presence of corn in great excess over the other grains named.

Most of the samples examined represent goods made solely for local use; a few are sold in many States:

Quaker Dairy Feed, made by the American Cereal Co., of Chicago, is composed of wheat and oats products; no guaranty accompanied the sample, but in New York and New England it is guaranteed to contain 12.03 per cent. of protein and 2.5 per cent. of fat; the Connecticut Bulletin 133 gives the results of 28 recent analyses as 13.53 per cent. protein and 3.13 per cent. fat. The samples analyzed here show a considerably inferior composition. The makers of sample No. 10 are not reported; it differs from the others in containing considerable quantities of white corn, its protein being decreased and its fat increased as a result.

Corn, Oats and Barley also made by the American Cereal Company, is represented by samples Nos. 21 and 68. No guaranty of composition accompanied them. The average of six recent New England analyses gives 11.9 per cent. of protein and 4.5 per cent. of fat. The Pennsylvania samples are considerably inferior.

Sample 26, of the same name, but reported as made by the Toledo Milling Company, is very far inferior, containing a very large proportion of hulls.

H. O. Dairy Feed, made my the H. O. Company of Buffalo, and composed of oat hulls with corn, wheat and cotton-seed meal, is represented by samples 85 and 112. It is guaranteed to contain 18.46 per cent. of protein and 4.53 per cent. of fat. The average of nine recent New England analyses is 18.06 per cent. of protein and 4.01 per cent. of fat. The Pennsylvania samples are far inferior.

H. O. Horse Feed, made by the same company, and containing a little linseed instead of cotton-seed meal, is guaranteed to contain 12.42 per cent. of protein and 4.54 per cent. of fat. The average of 18 recent New England analyses is 12.4 per cent. of protein and 4.2 per cent. of fat. Again, Pennsylvania samples are inferior.

Sucrene Dairy Feed, reported as made by Brook and Pennock, of Philadelphia, is accompanied by no guaranty. Its chief proteid ingredient is linseed meal; by roasting, the other substances contained have been darkened; a considerable proportion of reducing sugars is present. An analysis made by the Massachusetts Station (B. 64, p. 22), shows 18.69 per cent. protein and 2.97 per cent. fat.

SPECIAL POULTRY FOODS.

A number of "poultry foods" were examined:

No.	Manufacturer.	Dealer.	Price per ton.
89	Simpson Bros., Norristown,	Simpson Bros.,	$26 00
131	Bennett & Millett, Gouverneur, N. Y.,	Snyder Bros., Dalton,	40 00
138	Smith & Romain, New York,	Snyder Bros.,	25 00
142	American Cereal Co., Chicago, Ill.,	Snyder Bros.,	25 00
148	(Shipped from Philadelphia),	Snyder Bros.,	17 00

The descriptions and analyses of these foods are as follows:

No.	Description.	Moisture.	Protein.	Fat.
89	Superior poultry food,	11.00	13.50	4.15
131	Clover meal for poultry,	9.27	6.38	2.00
138	Boiled beef and bone for poultry,	5.84	42.63	17.97
142*	American poultry food,	9.45	11.75	4.93
148	Rice feed for poultry,	8.55	10.94	9.28

* Said to be composed of corn, oats, wheat and barley.

Microscopic examination indicates that No. 89, Simpson's Poultry Food, is a mixture of middlings, oats and corn; the proportion of hulls seems rather excessive.

No. 131, "Clover Meal," appears to be very fine-cut clover hay.

No. 138 shows nothing foreign to the name.

No. 142, composed, as classified, of oats, corn, wheat and barley.

No. 148 composed chiefly of rice hulls and polish.

Of these goods, several are worthy of further remark: The price of No. 131, even after the most extreme allowance for the expense of retailing in small quantities, is altogether out of proportion to the food value. Clover hay has an average of 12.3 per cent. protein, sometimes rising to 20.9 per cent., and an average of 3.3 per cent. of crude fat or ether-extract, sometimes reaching 5.9 per cent. The shatterings, commonly used on the farm as a poultry food, are still richer in protein. A Connecticut analysis gives for this poultry food, 9.5 per cent. protein and 2.42 per cent. fat, a much higher value.

The proportion of fat in the rice feed, No. 148, is unusually high, otherwise the composition is normal; the range of composition for the more important rice by-product, obtained by the investigations of a number of the Southern experiment stations is:

	Protein, per cent.	Fat, per cent.
Rice bran,	10.9-13.6	5.2-10.9
Rice hulls,	2.9-4.7	0.6-0.9
Rice polish,	10.9-12.9	6.5-8.0

A large proportion of the food is evidently derived from the polish.

American Poultry Food, represented by sample No. 142, is on sale in other States and has been guaranteed in New York State to contain 13.65 per cent. of protein and 3.96 per cent. of fat. The average of nine recent analyses in States having food controls shows 13.20 per cent. of protein and 6.20 per cent. of fat. The Pennsylvania sample is conspicuously inferior.

CONDIMENTAL FOODS.

Two samples of foods of this class were received:

No.	Manufacturer.	Dealer.	Price per ton.
87	Simpson Bros., Norristown, Pa.,	Simpson Bros.,	$160 00
254	John W. Barwell, Waukegan, Ill.,	F. L. Heath, Corry, Pa.,	70 00

No. 87, Simpson Bros'. Condimental Stock Food is stated by them to have given good satisfaction in general use in their locality. The percentage composition, in terms of the ordinay food analysis, is as follows:

	Per cent.
Moisture,	13.50
Ash,	16.96
Protein,	7.25
Fiber,	9.38
Nitrogen-free extract,	50.41
Fat,	2.50
	100.00

The composition of the ash is such as to indicate the presence of 4.94 per cent. of common salt and about 13.28 per cent. of Epsom salts; a very considerable amount of iron is also present, probably in the form of oxid.

Microscopical examination indicates that the principal vegetable material present is the hulls, glumes, palets and a portion of the cob of corn, together with some starch; bits of charred matter also appear. The material has a slightly defined aromatic odor.

No. 254, Blatchford's Calf Meal, has been frequently examined. It is claimed to be "The Perfect Milk Substitute," but the directions show that it is to be used in connection with the other foods commonly given to calves at their several stages of growth. It is claimed to be chiefly composed of the "carob" or "locust bean" meal with leguminous seeds, such as the lentil, and oleaginous seeds, such as flax seed, and to contain no cheap mill feeds.

On analysis, the following results were obtained:

	Per cent.
Moisture,	7.20
Protein,	23.94
Fat,	4.70

The average of six recent analyses (Connecticut Station, Bulletin 133, page 28) shows 24.45 per cent. protein and 4.62 per cent. fat.

The carob-bean has recently been investigated by the Connecticut Station (B. 130, p. 21). In 100 parts of the pod fruit there are 7.5 per cent. of seeds and 92.5 per cent. of empty husk or pod. The percentage composition of the several parts and of the whole is:

	Seeds.	Husks.	Full pod.
Mosture,	12.84	14.15	14.05
Ash,	3.27	3.25	3.26
Protein,	15.00	4.81	5.57
Fiber,	7.16	4.80	4.98
Nitrogen-free extract,	59.90	72.77	71.80
Fat,	1.83	.22	.34
	100.00	100.00	100.00

These figures agree with European analyses.

The composition of the "calf meal" and the carob bean are too different, therefore, to make it possible for the latter to constitute the greater part of the former. Dr. A. L. Winton, of the Connecticut Station, found linseed meal to be the chief constituent, and beside the carob bean, there were also present cotton-seed meal, a wheat product and fenugreek. These findings agree essentially with those of our microscopic examination of sample No. 254.

Composition of Other Condimental Foods.

Within the past year or two, extensive examinations, chemical and microscopical, have been made of the more commonly sold condimental foods. This work has been especially taken up by the Connecticut and Massachusetts Experiment Stations, though others have added work of value.

Owing to the prevalence of this class of goods in this State, it has been thought of interest to present in compendious form, the results of these investigations. The food analyses, made for the purpose of determining the proportions in which the ordinary food constituents are present, will be grouped in tabular form. The results of microscopical and special chemical examinations will be separately presented. The prices per ton affixed are calculated from the pound prices at which the goods are retailed; doubtless these rates could be greatly reduced in wholesale transactions in these several trade articles, but owing to the large claims commonly advanced as to the nutritive effect of these materials when consumed in small quantities, the comparison of prices by the method adopted is not an unfair one.

American Cattle Feeding Salts, made by the American Cattle Feeding Salts Co., 138-140 55th street, New York city, John M. Draper, Agricultural and Research Chemist, Manager. Price not stated. Claimed to consist of "various tonic substances and natural salts," which when added to other feeds is a means of growing prime beef, brighter in color, wavy or marbled in texture, and with pure white fat, in much less time than under the present system of feeding." Analysis by the Connecticut Station shows:

	Per cent.
Common salt,	16.0
Glauber's salts,	63.5
Epsom salts,	4.8
Carbonate of soda,	9.3
Matter insoluble in water,	1.5
Water and other volatile matter,	4.9
	100.0

American Spice Food, made by the American Spiced Food Co., Boston. Price not stated. Found by the Massachusetts Station (B. 71, pp. 28-9) to consist chiefly of corn with an addition of pepper.

American Triumph Horse and Cattle Food, made by McKenzie and Winslow, Fall River, Mass. Price $200 per ton. According to the Massachusetts Station (Bulletin 71, p. 28) it is chiefly composed of corn, barley and some material rich in protein, with some charcoal and an aromatic substance like fenugreek.

American Triumph Poultry Food, made by the same firm. Price $200 per ton. According to the Massachusetts Station (*Loc. cit*) it is chiefly composed of rye, corn, barley and some material rich in protein, together with pepper and an aromatic like fenugreek.

Anglo-American Food for Stock made by the Anglo-American Mfg. Co., Boston. Price $360 per ton. Food analysis made by the New York Experiment Station (Bulletin No. 267), but no report made upon the nature of the ingredients.

Anglo-American Poultry Food, made by the same company. Price not stated. According to the Massachusetts Station (B. 71, p. 30) it is chiefly composed of wheat and rye brans, together with corn, some materials rich in protein, charcoal and pepper.

Banner Poultry Food, made by the Banner Food Co., Auburn, N. Y. Price $200 per ton. According to the Massachusetts Station (*Loc. cit*) it is chiefly composed of linseed meal and wheat offals, together with some salt, charcoal and phosphate of lime.

Banner Stock Food, made by the same company. Price not stated. Is composed, according to the Massachusetts Station, chiefly of linseed meal, together with wheat offals, oats, charcoal, salt and sulfates, probably in the form of Glauber's salts.

Barwell's Horse and Cattle Food, made by John W. Barwell, Waukegan, Ill. Price $120 per ton. Is chiefly composed of linseed meal with, perhaps, some flaxseed meal and other ingredients not determined (Massachusetts Station).

Baum's Poultry Food, made by Baum's Castorine Company, Syracuse, N. Y. Price $250 per ton. According to the Connecticut Station (B. 132, p. 5) this is composed of linseed meal, wheat feed, cayenne pepper, charcoal, salt, Epsom salts, iron oxid and sulfur; the latter is present in the "crude fat" to the amount of 6.73 per cent. of the entire material. The salt amounts to 5 per cent. approximately.

Baum's Stock Food, made by the same company. Price $180 to $200 per ton. According to the Connecticut Station (*Loc. cit.*) it is composed of linseed meal, charcoal, salt, Epsom salts and sulfur; the same finding was made by the Massachusetts Station. There is 3.5 per cent. of salt and about 4 per cent. of free sulfur present, with probably 3 per cent. of Epsom salts.

Benjamin's Food for Horses and Cattle, made by Benjamin's Food Co., Danbury, Conn. Price $250 per ton. Composed of linseed meal, wheat feed and fenugreek (Conn. Sta., B. 132, p. 5).

Benjamin's Poultry Food, made by the same company. Price $250 per ton. According to the Connecticut Station, it is composed of linseed meal, wheat feed, corn meal, cotton-seed meal and mustard hulls.

Champion Horse and Cattle Food, made by the Champion Food Co. Price $300 per ton. Chiefly composed of corn, with linseed, rice, charcoal, salt and sulfates, probably Glauber's salts.

Climax Stock Food, made by L. B. Lord, Burlington, Vt. Price $210 per ton. Composed, according to the Massachusetts Station, chiefly of wheat and barley, together with salts and copperas. The New York Station found in one sample a very large quantity of sulfur, constituting most of the ether-extract.

Colonial Poultry Food, made by the Puritan Mfg. Co., Rochester, N. Y. Price not stated. Composed chiefly of barley and other cereals, charcoal, salt and pepper. (Mass. Sta., B. 71, p. 30.)

Colonial Stock Food, made by the same company. Price $200 to $275 per ton. Composed, according to the Massachusetts Station, of wheat, a large amount of charcoal, salt and a condiment resembling fenugreek.

Dow's Poultry Meal, made by J. C. Dow, Boston. Price $300 per ton. Composed, according to the Massachusetts Station, of meat, bone, salt and oyster shells.

Eggine, made by the Eggine Co., Hartford, Conn. Price not stated. Composed, according to the Massachusetts Station, chiefly of fine ground oyster shells, with animal matter, pepper, charcoal and Epsom salts.

Eureka Egg Food, Jos. Breck's Sons Corporation, Boston, Mass. Price not stated. Composed of cereals, highly proteid material, charcoal, salt and oyster shells (Mass. Sta., B. 71, p. 30).

Flagg's Poultry Food. Price $240 per ton. Composed, according to the Massachusetts Station, of corn, wheat offal, pepper, salt, charcoal, Epsom salts and Venetian red.

Flower City Horse and Cattle Food. Maker and price not stated. No details given as to the nature of the ingredients.

Dr. Hess's Poultry Panacea, made by Dr. Hess and Clark, Ashland, O. Price $340 per ton. Composed, according to the Connecticut Station, of wheat feed, charcoal, salt, carbonate of lime and iron oxid (Venetian red); nearly 12 per cent. of salt is found present. The Massachusetts Station reports the presence of barley and Epsom salts in addition.

Dr. Hess's Stock Food, made by the same firm. Price $140 per ton. According to the Massachusetts Station, it consists chiefly of bran, together with a material high in protein, charcoal, salt, iron, Glauber's salts, and a condiment resembling fenugreek.

Ideal Egg Food, made by the Poultry Supply Co., Boston. Price not stated. Composition, according to the Massachusetts Station, chiefly of cereals, with material high in protein, pepper, charcoal, iron, carbonate of lime and Glauber's salts.

International Poultry Food, made by the International Food Co., Minneapolis. Price $250 per ton. Examination at the Connecticut Station shows it to be composed of wheat feed, cayenne pepper, a bitter drug, charcoal and salt, about 2.25 per cent.

International Stock Food, made by the same company. Price $250 to $400 per ton. Composed, according to the Connecticut Station, of wheat feed, cayenne pepper, charcoal, salt (8.38 per cent.) and a bitter drug resembling gentian. This finding is, in the main, confirmed by the Massachusetts Station.

Jersey Tonic and Condition Powder, made by H. A. Esterbrook, Fitchburg, Mass. Price $360 per ton. Composed of wheat offal, ground herbs, pepper, Glauber's salts and Venetian red. (Mass. Sta., B. 71, p. 30.)

Knight's English Vegetable Food, made by Knight's Stock and Poultry Food Co. Price $140 per ton. Composition, chiefly wheat offal, with rye, corn, charcoal, salt and a condiment resembling fenugreek. (Mass. Sta., B. 71, p. 30.)

Knight's Poultry Food, made by the same company. Price $200 per ton. Composed chiefly of bran, with corn, some material rich in protein, salt, sand and an aromatic resembling fennel.

Lightning Horse, Cattle and Poultry Powders, made by the Herb Medicine Co., Springfield, O. Price $400 per ton. Analyzed by Virginia Station (B. 107, p. 232); no statement is made concerning the ingredients save that the ether-extract is chiefly composed of sulfur.

McClaren's English Horse Food, made by McClaren, Brockton, Mass. Price not stated. Composed chiefly of corn, oats, wheat, rice and a bitter substance resembling gentian. (Mass. Sta., B. 71, p. 28.)

Magic Poultry Food and Egg Producer, made by Magic Food Co., Chattanooga and St. Louis. Price $250 per ton. Analysis by Virginia Station without details as to the nature of the ingredients.

Magic Stock Food (Mansfield), made by the same company. Price $250 per ton. Analysis as in case of the previous food.

Chas. Marvin Stock Food, manufacturer not named. Price $1,000 per ton. Ordinary food analysis made by the New York Station without detail as to the nature of the ingredients. (B. 166, p. 267.)

Matthews Compound Food, made by Eastman Bros., Framingham, Mass. Price not stated. Chiefly composed of cereals with the addition of linseed meal and salt. (Mass. Sta., B. 71, p. 28.)

Medicated Meal, made by F. C. Sturtevant, Hartford, Conn. Price $400 per ton. Composed of linseed meal, corn meal, ginger, fenugreek, a bitter drug and sulfur (about 3 per cent.) (Conn. Sta., B. 132, p. 5.)

Myers' Royal Horse and Cattle Spice, Myers', Niagara Falls, N. Y. Price $200 to $250 per ton. Composed, according to the Connecticut Station, of linseed meal, corn meal, wheat feed, malt sprouts, mustard hulls, turmeric, cocoa shells, salt and fenugreek. The Massachusetts Station indicates the additional presence of rice, oat and bean meals; the salt amounts to 16.5 per cent.

Myers' Royal Poultry Spice, made by the same firm. Price $300 to $350 per ton. Composition, according to the Connecticut Station, like the foregoing with the omission of the malt sprouts and the addition of cayenne. The Massachusetts Station reports the presence of rape seed. The salt, in the sample examined by the Connecticut Station, amounts to nearly 13 per cent.

Nutriotone, made by the Thorley Food Co., Chicago. Price $320 to $500 per ton. This is one of the older condimental foods on the market and has been frequently examined. A recent examination by the Connecticut Station shows the presence of linseed and cottonseed meals, corn meal, wheat feed, salt (13.10 per cent.), charcoal, sulfur (.83 per cent.) and fenugreek. The Massachuetts Station reports the presence of bean meal.

Orange Electric Food, made by G. E. Vincent, Catskill, N. Y. Price $340 per ton. Composed of corn and linseed meals, charcoal and sulfur (.4 per cent.) (Conn. Sta., B, 132, p. 5.)

Pratt's Animal Regulator. made by the Pratt Food Co., Phila., Pa. Price $320 to $500. Composed, according to the Connecticut Station, of corn meal, salt (10.11 per cent.), charcoal, fenugreek and a bitter substance resembling gentian. The Massachusetts Station reports the presence, in addition, of fennel and Glauber's salts.

Pratt's Horse and Cattle Food, made by the same firm. Price $146.67 per ton. Composed chiefly of cereals and beans with fennel. (Mass. Sta., B. 71, p. 28.)

Pratt's Poultry Food, made by the same company. Price $240 to $320 per ton. The Connecticut Station found the following ingredients, corn meal, wheat feed, iron oxid, sulfur (.81 per cent.), and a bitter drug. The Massachusetts Station reports upon one sample in about the same terms with the addition of cayenne, but upon another as composed of corn, bean and rice meals, pepper, Venetian red and fenugreek.

Prolific Poultry Food, made by L. B. Lord, Burlington, Vt. Price not stated. Composed of animal matter, linseed husks, charcoal, sand, salt, Epsom salts and carbonate and phosphate of lime. (Mass. Station.)

Rochester Horse and Cattle Food; made by the Rochester Horse and Cattle Food Co., Rochester, N. Y. Price $500 per ton, pound package price; $170 in 200 pound lots. The Pennsylvania Station (Rep. 1899, p. 172) found it to contain wheat offal, some richly proteid material, salts, charcoal, an aromatic and a bitter substance.

Royal Stock Food, name of maker not stated. Price $125 per ton. Food analysis without detail as to ingredients by the New York Station.

Rust's Egg Producer, made by Wm. Rust & Sons, New Brunswick, N. J. Price $500 per ton. Chiefly composed of shells and charcoal, together with some material rich in protein and pepper. (Mass. Station.)

Sheridan's Condition Powder, made by I. S. Johnson & Co., Boston. Price $2,000 per ton. Composed of linseed, cellular matter, ginger, pepper, charcoal, carbonate and phosphate of lime and Epsom salts. (Mass. Station.)

Stanley's Condition Powder, made by J. J. Stanley, Lawrence, Mass. Price $120 per ton. Composed chiefly of wheat and corn with salt and fenugreek. (Mass. Station.)

Thorley's Horse and Cattle Food, made by The Thorley Food Co., Chicago, Ill. Price not stated. Chiefly composed of rice and linseed, with beans, salt and fenugreek. (Mass. Station.)

Triplex Poultry Food, made by the Triplex Food Co., New Brunswick, N. J. Price $240 to $340 per ton. Composed of linseed meal, wheat feed, charcoal, ground bone, lime carbonate, iron oxid and sulfur (nearly 1 per cent.) (Conn. Station.) The Massachusetts Station finds, in addition, corn, pepper and Glauber's salts.

Triplex Stock Food, made by the same company. Price not stated. Food analysis, without detail as to ingredients, by the New York Station.

Weston's Condition Powder, made by J. W. Weston, New York city. Price $320 per ton. Composed of wheat, corn, bean and linseed meals, with fenugreek. (Mass. Station.)

White's Stock Food, made by the White Food Co., Taunton, Mass. Composed chiefly of bran with an admixture of fenugreek. (Mass. Station.)

Wilbur's Egg Food, made by Wilbur's Seed Meal Co., Milwaukee, Wis. Price $222 per ton. Analysis without description of ingredients by the Virginia Station.

Wilbur's Seed Meal, made by the same company. Price not stated. Analysis without statement of ingredients by the New York Station.

The results of the food analyses of the foregoing foods, together with an indication of the number of analyses upon which the statement is based and the sources from which they are drawn, are given in the following table. It should be borne in mind that the presence of mineral drugs in the condimental foods leads to some variation in the composition of the several groups of materials separated by the common analytical processes; thus, the free sulfur appears with the fat, the charcoal with the fiber, and, since the nitrogen-free extract is computed by subtracting the sum of the other groups from 100, it represents, in cases where large quantities of oyster shell have been admixed, not only sugar, starch and the usual constituents but also so much of the carbonic acid as is driven off from the shells in making the ash determination.

In this connection, it may be noted that the analyses of different Stations and even analyses of different packages by the same Station, show a tendency to very little uniformity of composition in most of these foods and point, in some cases, to a change of formula at convenience.

Food Analyses of Condimental Foods (per cent).

Name.	Number of analyses.*	Moisture.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
American Spiced Food, ...	1m	10.41	2.28	12.81	2.90	67.70	3.91
American Triumph Horse and Cattle Food, ...	1m	10.94	6.95	14.94	8.96	53.21	5.00
American Triumph Poultry Food,	1m	9.14	5.54	15.22	9.79	54.76	5.56
Anglo-American Food for Stock,	1n	7.20	13.28	15.50	7.86	25.80	4.85
Anglo-American Poultry Food,..	1m	7.99	5.33	16.06	8.70	56.59	5.33
Banner Poultry Food, ...	1m	8.78	11.29	19.94	12.37	41.12	6.50
Banner Stock Food, ...	1m	8.88	9.35	23.56	15.24	38.01	4.96
Barwell's Horse and Cattle Food,	1m	7.52	6.41	20.72	5.16	50.47	9.72
Baum's Poultry Food, ...	1c	6.95	16.68	19.53	15.40	32.62	8.82
Baum's Stock Food, ...	3cmn	9.07	9.68	26.52	16.47	30.79	7.47
Benjamin's Food for Horses and Cattle, ...	1c	6.92	5.52	27.82	7.57	45.92	6.25
Benjamin's Poultry Food, ...	1c	7.05	5.42	29.19	8.44	42.92	6.98
Champion Horse and Cattle Food,	2mn	9.55	12.52	11.72	4.18	57.43	4.60
Climax Stock Food, ...	2mn	8.72	18.09	9.99	4.42	38.06	20.72

Name.	Number of analyses.	Moisture.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
Colonial Poultry Food, ...	1m	9.71	6.85	10.00	4.84	65.82	2.78
Colonial Stock Food, ...	2mn	8.97	11.04	10.46	10.45	56.27	2.81
Dow's Poultry Meal, ...	1m	20.22	36.75	30.50	2.06	....	2.02
Eggine, ...	1m	.73	58.74	3.06	14.78	20.75	1.94
Eureka Egg Food, ...	1m	5.98	20.79	16.50	7.78	44.34	4.61
Flagg's Poultry Food, ...	1m	8.34	9.14	13.97	5.85	58.92	3.78
Flower City Horse and Cattle Food, ...	1n	9.27	11.29	14.37	9.70	50.25	5.12
Dr. Hess's Poultry Panacea, ...	3cm	8.22	29.00	11.65	4.86	44.36	1.91
Dr. Hess's Stock Food, ...	1m	7.82	13.08	16.19	7.11	52.55	3.25
Ideal Egg Food, ...	1m	8.02	13.98	18.50	9.19	45.49	4.82
International Poultry Food, ...	1m	6.79	7.87	14.88	13.97	49.69	6.80
International Stock Food, ...	3cmn	7.78	10.05	15.05	9.61	50.20	7.31
Jersey Tonic and Condition Powder, ...	1m	11.41	11.98	14.07	7.31	52.04	3.19
Knight's English Vegetable Food, ...	1m	8.59	12.69	15.25	7.47	51.47	4.53
Knight's Poultry Food, ...	1m	7.27	22.82	14.69	7.21	44.29	3.72
Lightning Horse, Cattle and Poultry Powders, ...	1v	11.15	3.05	17.44	3.70	38.48	26.18
McClaren's English Horse Food,.	1m	11.05	5.83	10.38	1.43	67.96	3.35
Magic Poultry Food and Egg Producer, ...	1v	2.67	18.03	11.19	18.81	44.85	4.45
Magic Stock Food, ...	1v	8.10	5.39	11.00	22.45	47.82	5.24
Chas. Marvin Stock Food, ...	1n	8.26	5.97	30.94	10.63	39.92	4.28
Matthew's Compound Food, ...	1m	10.88	10.98	15.38	3.34	54.39	5.03
Medicated Meal, ...	1c	6.34	8.94	24.10	10.98	39.08	10.56
Myer's Royal Horse and Cattle Spice, ...	3cm	9.11	13.11	17.32	5.85	50.90	3.71
Myer's Royal Poultry Spice, ...	2cm	8.28	11.64	16.50	7.14	51.56	4.88
Nutriotone, ...	3cmn	7.56	18.17	20.19	5.09	43.52	5.4
Orange Electric Food.	1c	6.80	4.00	15.03	7.81	58.92	7.44
Pratt's Animal Regulator, ...	2cm	7.89	11.70	9.91	3.23	62.80	4.4
Pratt's Horse and Cattle Food,...	2mm	8.29	5.82	14.97	6.21	57.50	7.21
Pratt's Poultry Food, ...	3cm	8.35	6.70	14.78	6.22	56.26	7.69
Prolific Poultry Food, ...	1m	8.39	23.99	20.19	9.21	31.67	6.55
Rochester Horse and Cattle Food,	2np	8.40	9.74	16.32	11.70	47.74	6.10
Royal Stock Food, ...	1n	5.56	44.07	11.25	9.73	25.87	3.52
Rust's Egg Producer, ...	1m	4.56	52.51	19.31	6.52	13.57	3.53
Sheridan's Condition Powder, ...	2m	7.57	16.50	16.00	15.07	30.62	14.24
Stanley's Condition Powder, ...	1m	9.35	5.46	13.13	5.83	61.91	4.32
Thorley's Horse and Cattle Food,	1m	10.55	9.92	19.19	9.80	44.73	5.81
Triplex Poultry Food, ...	2cm	5.72	39.80	18.17	5.27	26.53	4.51
Triplex Stock Food, ...	1n	7.10	12.05	15.31	6.31	53.57	5.66
Weston's Condition Powder, ...	1m	9.31	5.09	15.63	5.00	59.27	4.70
White's Stock Food, ...	1m	10.21	5.79	15.81	10.44	52.33	5.42
Wilbur's Egg Food, ...	1v	7.72	10.14	18.43	13.23	46.26	4.22
Wilbur's Seed Meal, ...	1n	7.13	12.16	20.00	8.18	46.90	5.63

*c, Connecticut Station; m, Massachusetts Station; n, New York (Geneva) Station; p, Pennsylvania; v, Virginia Station.

The most striking feature about these materials is their enormous cost to the purchaser, $100 to $2,000 per ton. Their direct cost to the manufacturer is quite another matter. Their major proportion by weight is composed of ordinary feeding stuffs, costing at retail from $15 to $40 per ton. In a few cases, especially of so-called "egg-foods," they are more largely composed of oyster shells, whose market value is certainly much less. The other ingredients that enter into their composition in at all important quantities are bone, charcoal, flowers of sulfur, common salt, Glauber's salts, Epsom salts and Venetian red; while there are also added certain spicing, aromatic or bitter substances in small quantity.

The wholesale prices of some of the less common materials, as given by the *Oil, Paint and Drug Reporter* of New York, for July 8, 1901, are:

	Cents per pound.
Epsom salts,	.9 to 1.25
Flowers of sulfur,	1.85 to 2.05
Venetian red,	1.8 to 3.0
Ginger root,	4 to 4.25
Anise seed,	7.75 to 8.5
Fenugreek,	2.0 to 2.25
Fennel seed,	5.0 to 6.0

There is therefore no reason in the cost of the ingredients for the very great charges made for these mixtures.

In the second place, it is evident that the makers use much the same range of ingredients but select individual materials and proportions differently. The one common characteristic is the claim each makes, first, for the great nutritive value of very small quantities of his article of manufacture, and in most cases, second, for its medicinal value for a wide range of diverse ailments. Clearly, since exact selection of material and proportion is of so little importance, any reader of this paragraph can make a "condition powder" for his own stock with as good prospect of valuable results and at a very great saving of cost.

But as to the value of such condimental and semi-medicinal preparations: First, as used for healthy animals. Any direct nutritive value they possess is due to the common feeding stuffs they contain, but the quantities fed are too insignificant to cause considerable gains in production. Any indirect value they may have must be due to some economy of the other foods with which they are always directed to be fed, such economy being in the way of increased digestion of the food or its better utilization by the animal after digestion. A number of careful experiments have been made to determine the fact of such effect from condimental foods, but in not a single instance is there evidence of any economic action of the kind.

As to their supposed medicinal action: The ingredients commonly found have different effects. Some are used in veterinary practice as stomachics, stimulating the coatings of the stomach and bowels—anise seed, cayenne pepper and black or white pepper in doses of 2 drachms, fennel seed in doses of 1 drachm and ginger root in doses of 1 oz. Stomachics are employed in cases of pronounced indigestion; the doses are not expected to be given except on rare occasions. Charcoal is useful to reduce accumulations of gas; for this purpose considerable doses must be administered.

Epsom and Glauber's salts are used as purgatives; the former in doses of 1 to 2 pounds act as a laxative for the ox, the latter in doses of 1½ pounds as a purgative for the horse. Sulfur, also, in doses of 1 oz. acts as a laxative; in doses of 3 to 4 oz. the latter acts to stimulate the perspiratory glands.

Gentian is frequently used as a bitter tonic, with decided laxative and stomachic effects; and iron oxid is also employed as a tonic.

So far as the stomachics are concerned, those of the usual condimental foods are often of the least efficient character, such as fenugreek, which is not often included in modern lists of *materia medica.*

The quantities of the condimental foods necessary to be fed to give the usual medicinal dose of any one of the medicinal ingredients are very large. Especially should it be urged that a sick animal needs specific treatment for its particular ailment. That beneficial results are sometimes found to attend the use of condimental foods is admitted, but the benefit is gained at an unnecessary cost and is rather accidental than the logical result of a discriminating treatment.

The increased appetite often observed to follow the use of such foods, might often be secured by any change of diet, especially by the proper use of salt. Mild laxative effects are better secured by green food and a proper use of mashes in the diet. If tonic effects are desired, use the known materials for producing such effects and in the requisite quantities. See that fowls have the necessary access to cracked bone or oyster shells to furnish the egg shell materials.

In view of their great cost, of their comparatively small direct nutritive value, their lack of indirect nutritive value, their weakness and uncertain fitness as medicinal agents, the use of such commercial mixtures seems entirely unwarranted.

RELATIVE COST OF FEEDING STUFFS AS SOURCES OF PROTEIN.

In the introductory paragraphs of this bulletin it has been noted that the principal purpose in the introduction of the commercial feeding-stuffs upon the farm is to secure an increased proportion of protein in the farm rations. It will be of interest therefore to compare the expenditure required in purchasing some convenient unit quantity, say 20 pounds, of this nutrient in the various classes of commercial feeds.

This method of comparison is further justified by reason of the fact that protein is usually the chief variable among the several groups of food constituents present. On the other hand, it would be evidently incorrect to charge the protein with the entire cost of the feeding-stuff, the major portion of which is composed of other materials of some value.

Commercial Feeding Stuffs Arranged According to Their Percentage of Protein.

	Protein.	Fat.	Cost per ton.	Expenditure in buying 20 pounds of protein.
Cottonseed meal,	44.40	10.10	$27.50	0.619
Linseed meal, new process,	34.25	2.63	27.67	0.808
Linseed meal, old process,	34.10	6.04	28.56	0.838
Buckwheat middlings,*	31.06	8.77	18.00	0.580
Gluten feed,	24.72	2.84	18.33	0.741
Malt sprouts,	22.96	1.61	16.17	0.704
Germ oil cake,*	22.56	9.77	22.50	0.997
Red dog flour,	19.14	4.87	19.44	1.016
H. O. dairy feed,	16.72	3.39	21.25	1.271
Wheat shorts,	16.52	5.18	19.33	1.170
Buckeye wheat feed,*	16.50	4.53	20.00	1.212
Wheat middlings,	16.05	4 60	19.31	1.203
Wheat bran,	15.30	4.48	18.85	1.232
Wheat feeds,	14.21	3 90	19.33	1.360
Sucrene dairy feed,	14.00	2.43	18.50	1.321
Sugar corn feed,*	12.81	2.72	14.00	1.093
Wheat and oats feed,	12.23	4.15	18.00	1.472
Rye and oats feed,	11.03	3.24	21.00	1.904
H. O. horse feed,	10.97	3.26	21.25	1.937
Quaker dairy feed,	10.94	2.88	18.00	1.828
Wheat and corn feeds,	10.92	3.90	18.00	1.645
Cerealine feeds,	10.84	8.68	18.00	1.660
Corn bran,	10.75	10.37	17.33	1.612
Hominy chop,	10.75	8.59	18.50	1.721
Corn, oats and barley (American Cereal Co).,	10.47	4.57	20.00	1.911
Rye chop,	10.29	1.77	26.00	2.527
Rye and corn,	10.19	3.47	20.67	2.028
Corn, oats and rye,	9.95	3.40	23.11	2.333
Corn, oats and barley (average of all),	9.44	4.03	20.33	2.154
Corn chop,	9.06	4.03	20.17	2.226
Corn meal,	8.87	4.66	19.82	2.234
Corn and oats feed (in general),	8.82	4.27	19.63	2.226
Victor corn and oat feed,	8.04	3.59	18.00	2.239
Sugar feed,*	7.94	7.40	16.00	2.015
Corn-and-cob chop,	7.40	2.44	16.10	2.178
Crescent oat feed,	6.82	3.25	14.75	2.148
Friends' consolidated dairy food,*	6.31	3.08	16.00	2.536
Cereal Feed American Cereal Co.),*	4.06	1.55	16.00	3.941

* One sample only.

In some of the cases included in the foregoing table, the analytical results and the prices are derived from too small a number of samples and quotations to afford a perfectly representative figure; but in the case of goods made on a large scale by manufacturers whose work is subject to chemical check, even a single analysis should approximate closely to the average composition.

The foods may therefore be divided broadly into classes as follows:

I. Cotton-seed meal, containing over 40 per cent. of protein with a unit of protein requiring an expenditure of about 62 cents.

II. Buckwheat middlings and linseed meal, 30 to 35 per cent. of protein; expenditure per unit of protein, 58 to 84 cents.

III. Malt sprouts, gluten feed and germ-oil cake, 20 to 25 per cent. of protein; expenditure per unit of protein, 70 cents to $1.00.

IV. Wheat offal of various sorts, H. O. Dairy Feed and Sucrene Dairy Feed, 14 to 20 per cent. of protein; expenditure per unit of protein, $1.02 to $1.90.

V. Corn meal, corn bran and similar corn by-products, rye chop, oats chop and certain mixed cereal feeds, about 9 to 13 per cent. protein; expenditure per unit of protein, $1.10 to $2.53.

VI. Corn-and-cob chop, sugar feed, oat hulls and feeding-stuffs largely composed thereof, 4 to 9 per cent. of protein; expenditures per unit of protein, $2.01 to $3.94.

It is difficult to see how a farmer already well supplied with starchy foods and abundance of good roughage can afford to buy the foods of class VI, which are not only poorer in protein than the grain foods he already has and are less digestible as a class than corn meal; nor if he needs roughage, how he can afford to pay for fine ground mill foods when corn stover of fair quality can be bought for a lower price.

Class V contains, in addition to good foods diluted with oat hulls, many standard grain foods; they are chiefly valuable as sources of starch, and, where protein is the chief thing sought, are too expensive to buy for general feeding purposes.

It is believed that while this classification does not take into account all the items which must be considered in estimating the real cost of a single food constituent, it may prove helpful in reaching safe conclusions in many cases.

COMMERCIAL FEEDING STUFFS IN PENNSYLVANIA AS COMPARED WITH THOSE IN NEIGHBORING STATES.

For several years past, a number of the New England and Middle States have made systematic surveys of the feeding-stuffs markets of their respective territories and published the results; in some States, laws regulating the trade in such commodities, requiring some guaranty of composition and establishing a chemical control, have been enacted. Under such conditions, it would be expected that dealers would more uniformly handle articles of prime quality and fully up to their guaranteed value, than in States where such regulations and control are not in force.

The following comparative table showing the composition of some of the principal commercial feeds as sold in this State and in the New England States where various forms of control are maintained, gives ground for serious reflection on the part of the average buyer of these goods in Pennsylvania. The New England figures are obtained from a compilation of the analyses from May, 1898, to January 1, 1900. (Conn. Sta., Bulletin 130, p. 8.)

Comparative Composition of Feeding Stuffs in Different States.

	Number of samples.	Protein.	Fat.
Cotton-seed meal:			
Pennsylvania,	8	44.40	10.10
New England,	205	45.40	11.12
Linseed meal:			
Old process:			
Pennsylvania,	25	33.32	5.98
New England,	25	35.70	7.20
New process:			
Pennsylvania,	3	34.25	2.63
New England,	31	38.20	2.40
Wheat bran:			
Winter wheat:			
Pennsylvania,	5	15.19	4.26
New England,	45	15.50	4.40
Spring wheat:			
Pennsylvania,	9	14.84	4.65
New England,	53	16.10	4.90
All brans analyzed:			
Pennsylvania,	39	15.30	4.48
New England,	120	15.80	4.70
Wheat middlings:			
Pennsylvania,	41	16.05	4.60
New England,	135	17.00	5.00
Mixed wheat feeds:			
Pennsylvania,	3	14.21	3.90
New England,	219	16.60	4.70
Red dog flour:			
Pennsylvania,	4	19.14	4.87
New England,	9	19.30	4.40
Corn meal:			
Pennsylvania,	15	8.87	4.66
New England,	17	9.50	4.00
Gluten feed:			
Pennsylvania;	12	24.72	2.84
New England,	69	29.68	3.74
Oat feeds:			
Crescent:			
Pennsylvania,	2	6.72	3.25
New England,	3	7.90	3.30
Others:			
Pennsylvania,	6	6.69	2.71
New England,	16	9.30	4.20
Corn-and-oat feeds:			
Victor (Am. Cereal Co.):			
Pennsylvania,	3	8.05	3.59
New England,	26	9.20	3.90
Others:			
Pennsylvania,	22	9.02	4.30
New England,	29	9.44	3.76
Quaker dairy feed (Amer. Cereal Co.):			
Pennsylvania,	2	10.94	2.88
New England,	5	12.80	2.9
Corn, oats and barley feed (Am. Cereal Co.):			
Pennsylvania,	2	10.47	4.57
New England,	6	11.9	4.5
H. O. dairy feed:			
Pennsylvania,	2	16.72	3.39
New England,	20	19.0	4.4
H. O. horse feed:			
Pennsylvania,	2	10.97	3.26
New England,	18	12.4	4.2

Commercial Feeding Stuffs Control.

The data presented in the previous pages exhibit a wide variability of composition in goods of this class selling under the same brand; the existence on the Pennsylvania market without accompanying guarantee, of large quantities of mixed feeds from whose names and appearance no adequate notion of their composition can be formed; a wide-spread use of almost valueless materials in commercial mixtures; considerable misbranding and occasional glaring adulteration. Furthermore, the average quality of the feeding stuffs sold in States that have for several years had cattle food control laws in operation, appears to be considerably superior to the quality of the goods sold under the same name in Pennsylvania.

It is believed that the preliminary comparison of the commercial cattle foods of Pennsylvania and New England made on the basis of the foregoing analyses and presented in the Preliminary Report of the Secretary of Agrictulture, 1900, pp. 47-8, supplied to the Legislature clear proof of the need for the Pennsylvania control law enacted during the present year.

Cattle food control legislation is very recent in America. The Maine and Massachusetts laws were enacted in 1897, those of Connecticut, New York and Rhode Island in 1899, followed by New Jersey and Vermont in 1900. For the purpose of affording those interested in such legislation an opportunity for the comparative study of the Pennsylvania law, the laws of the States above named are presented in the Appendix.

WEIGHTS OF FEEDING STUFFS.

For convenience of reference by those who measure instead of weigh their stable feeds, a statement of quart weights as compiled by Maj. H. E. Alvord, Chief of the Dairy Division, U. S. Dept. of Agriculture, and by Mr. H. G. Manchester (Conn. Station Bulletin No. 133, p. 13), are given below. Where differences are observed, they may fairly be attributed to a difference in the mechanical conditions of the material:

	Alvord, pounds.	Manchester, pounds.
Corn, cracked,	1.75	....
Corn meal,	1.43	1.5
Corn-and-cob meal,	1.38	....
Cotton-seed meal, old process,	1.56	1.5
Gluten feed,	....	1.2
Gluten meal,	1.50	1.7
H. O. dairy feed,	....	0.7
Linseed meal, old process,	....	1.1
Oats, whole,	1.00	1.2
Oats, ground,	.75	....
Rye bran,	....	0.6
Victor corn and oat feed,	....	0.7
Wheat, whole,	1.83	....
Wheat bran, coarse,	.63	.50
Wheat middlings, coarse,	....	.80
Wheat middlings, fine,	1.13	1.1
Wheat feed, mixed,	....	.60

COMPOSITION OF FEEDING STUFFS.

Giving the Maximum, Minimum and Average for Each Ingredient.

From Farm Bulletin No. 22 of the Department of Agriculture, Washington, D. C.

The figures given do not represent the results of single analyses, but are the highest and lowest results which have been found in the case of each ingredient. *They are given to show the limits within which each ingredient has been found to vary.*

Composition of Feeding Stuffs.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
GREEN FODDER.							
Corn fodder:*							
Flint varieties—	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	
Minimum,	51.1	0.7	0.6	2.1	4.3	0.3	....
Maximum,	90.8	1.8	4.0	11.4	36.3	1.3	....
Average,	79.8	1.1	2.0	4.3	12.1	0.7	40
Flint varieties cut after kernels had glazed—							
Minimum,	69.7	0.9	1.5	3.0	10.0	0.6	....
Maximum,	83.7	1.7	2.7	6.1	19.7	1.3	....
Average,	77.1	1.1	2.1	4.3	14.6	0.8	10
Dent varities—							
Minimum,	59.5	0.6	0.5	2.0	3.0	0.1	....
Maximum,	93.6	2.5	3.8	11.0	27.0	1.6	....
Average,	79.0	1.2	1.7	5.6	12.0	0.5	63
Dent varities cut after kernels had glazed—							
Minimum,	59.5	1.0	1.0	5.4	11.6	0.4	....
Maximum,	80.7	2.2	3.3	8.5	27.0	1.6	....
Average,	73.4	1.5	2.0	6.7	15.5	0.9	7

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*Corn fodder is the entire plant, usually a thickly planted crop. Corn stover is what is left after the ears are harvested.

Composition of Feeding Stuffs.—Continued.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
GREEN FODDER—Continued.							
Sweet varieties—	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	
Minimum,	69.3	0.8	0.9	1.9	3.2	0.1	....
Maximum,	92.9	2.6	2.7	8.5	19.4	1.0	....
Average,	79.1	1.3	1.9	4.4	12.8	0.5	21
All varieties—							
Minimum,	51.5	0.6	0.5	1.9	3.0	0.1	....
Maximum,	93.6	2.6	4.0	11.4	36.3	1.6	....
Average,	79.3	1.2	1.8	5.0	12.2	0.5	126
Leaves and husks, cut green—							
Minimum,	57.9	2.1	1.8	6.6	16.7	1.0	....
Maximum,	71.3	4.4	2.4	12.5	22.2	1.3	....
Average,	66.2	2.9	2.1	8.7	19.0	1.1	4
Stripped stalks, cut green—							
Minimum,	74.5	0.6	0.4	6.7	14.2	0.4	....
Maximum,	77.4	0.8	0.6	8.8	16.0	0.6	....
Average,	76.1	0.7	0.5	7.3	14.9	0.5	4
Rye fodder:							
Minimum,	74.4	1.3	2.3	4.7	4.9	0.2	....
Maximum,	84.3	2.4	3.0	14.9	12.4	0.7	....
Average,	76.6	1.8	2.6	11.6	6.8	0.6	7
Oat fodder:							
Minimum,	31.3	1.5	1.5	7.1	10.8	0.4	....
Maximum,	78.6	4.2	6.1	16.8	39.8	3.0	....
Average,	62.2	2.5	3.4	11.2	19.3	1.4	6
Redtop,* in bloom:							
Minimum,	51.5	1.7	2.0	8.0	11.7	0.6	....
Maximum,	76.2	2.9	4.3	15.7	21.9	1.1	....
Average,	65.3	2.3	2.8	11.0	17.7	0.9	5
Tall oat grass, † in bloom:							
Minimum,	62.3	1.6	1.7	9.2	13.0	0.6	....
Maximum,	73.5	3.0	3.3	9.7	20.7	1.5	....
Average,	69.5	2.0	2.4	9.4	15.8	0.9	3
Orchard grass, in bloom:							
Minimum,	66.9	1.6	1.9	5.8	9.9	0.7	....
Maximum,	77.3	2.9	4.1	11.1	16.6	1.3	....
Average,	73.0	2.0	2.6	8.2	13.3	0.9	4
Meadow fescue, in bloom:							
Minimum,	67.6	1.6	1.8	10.2	12.5	0.7	....
Maximum,	73.2	2.0	2.7	11.3	15.7	1.1	....
Average,	69.9	1.8	2.4	10.8	14.3	0.8	4
Italian rye grass, coming into bloom:							
Minimum,	69.6	2.1	2.6	5.5	11.5	1.1	....
Maximum,	76.6	2.8	3.8	7.5	15.4	1.6	....
Average,	73.2	2.5	3.1	6.8	13.3	1.3	24
Timothy,‡ at different stages:							
Minimum,	47.0	1.4	1.3	5.1	10.1	0.6	....
Maximum,	78.7	3.2	3.8	19.4	28.6	2.0	....
Average,	61.6	2.1	3.1	11.8	20.2	1.2	56
Kentucky blue grass, § at different stages:							
Minimum,	51.7	1.6	2.4	3.8	6.5	0.8	....
Maximum,	32.5	4.8	7.2	13.4	25.6	1.9	....
Average,	65.1	2.8	4.1	9.1	17.6	1.3	18

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*Herd's grass of Pennsylvania.

†Meadow oat grass.

‡Herd's grass of New England and New York.

§June grass.

Composition of Feeding Stuffs.—Continued.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
GREEN FODDER—Continued.							
Hungarian grass:	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	
Minimum,	62.7	1.9	2.8	7.6	9.1	0.5	....
Maximum,	78.3	2.2	3.2	10.8	20.1	1.1	....
Average,	71.1	1.7	3.1	9.2	14.2	0.7	14
Red clover, at different stages:							
Minimum,	47.1	0.9	1.7	1.8	3.5	0.3	....
Maximum,	91.8	4.0	7.1	14.7	25.8	1.8	....
Average,	70.8	2.1	4.4	8.1	13.5	1.1	43
Alsike clover,* in bloom:							
Minimum,	72.3	1.9	3.6	5.3	10.8	0.6	....
Maximum,	77.3	2.1	4.2	9.4	11.5	1.2	....
Average,	74.8	2.0	3.9	7.4	11.0	0.9	4
Crimson clover:							
Minimum,	78.4	1.4	2.7	3.5	7.0	0.6	....
Maximum,	84.6	2.0	3.5	6.3	9.7	0.8	....
Average,	80.9	1.7	3.1	5.2	8.4	0.7	3
Alfalfa,† at different stages:							
Minimum,	49.3	1.8	3.5	2.5	10.8	0.6	....
Maximum,	82.0	5.1	7.7	14.8	11.5	1.2	....
Average,	71.8	2.7	4.8	7.4	12.3	1.0	23
Serradella, at different stages:							
Minimum,	65.6	1.8	2.1	2.0	3.9	0.4	....
Maximum,	84.6	5.8	3.6	7.8	17.1	1.8	....
Average,	79.5	3.2	2.7	5.4	8.6	0.7	9
Cowpea:							
Minimum,	72.8	1.2	1.5	1.7	1.8	1.2	....
Maximum,	93.1	2.7	3.5	15.3	12.9	0.6	....
Average,	83.6	1.7	2.4	4.8	7.1	0.4	10
Soja bean:							
Minimum,	63.3	1.8	2.2	4.8	5.8	0.5	....
Maximum,	81.5	5.1	5.9	9.7	16.0	1.6	....
Average,	75.1	2.6	4.0	6.7	10.6	1.0	27
Horse bean:							
Average,	84.2	1.2	2.8	4.9	6.5	0.4	2
Flat pea (Lathyrus sylvestris):							
Average,	66.7	2.9	8.7	7.9	12.2	1.6	2
Rape:							
Average,	84.5	2.0	2.3	2.6	8.4	0.5	2
SILAGE.							
Corn silage:							
Minimum,	62.4	0.3	0.7	3.0	5.1	0.2	....
Maximum,	87.7	3.3	3.6	10.5	24.2	2.0	....
Average,	79.1	1.4	1.7	6.0	11.0	0.8	99
Sorghum silage:							
Minimum,	71.9	0.8	0.6	5.9	13.8	0.1	....
Maximum,	78.0	1.2	0.9	6.8	19.0	0.5	....
Average,	76.1	1.1	0.8	6.4	15.3	0.3	6
Red clover silage:							
Minimum,	61.4	1.9	3.0	5.1	8.1	0.9	....
Maximum,	78.6	3.0	5.9	13.9	14.3	1.6	....
Average,	72.0	2.6	4.2	8.4	11.6	1.2	....
Soja bean silage:							
Average,	74.2	2.8	4.1	9.7	6.9	2.2	1

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*Swedish clover.

†Lucern.

Composition of Feeding Stuffs.—Continued.

	Water.	Ash.	Protein	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
GREEN FODDER—Continued.							
Cowpea vine silage:	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	
Average,	79.3	2.9	2.7	6.0	7.6	1.5	2
Field pea vine silage:							
Average,	50.1	3.5	5.9	13.0	26.0	1.6	1
Silage of mixture of cowpea vines and soja bean vines, average,	69.8	4.5	3.8	9.5	11.1	1.3	1
HAY AND DRY COARSE FODDER.							
Corn fodder,* field cured:							
Minimum,	22.9	1.5	2.7	7.5	20.6	0.6	....
Maximum,	60.2	5.5	6.9	24.7	47.8	2.5	.....
Average,	42.2	2.7	4.5	14.3	34.7	1.6	35
Corn leaves, field cured:							
Minimum,	14.8	4.3	4.5	17.4	27.3	0.8	....
Maximum,	44.0	7.4	8.3	27.4	41.4	2.2	....
Average,	30.0	5.5	6.0	21.4	35.7	1.4	17
Corn husks, field cured:							
Minimum,	26.7	0.6	1.3	6.8	14.3	0.5	....
Maximum,	76.6	2.3	3.2	23.6	43.6	1.0	....
Average,	50.9	1.8	2.5	15.8	28.3	0.7	16
Corn stalks, field cured:							
Minimum,	51.3	0.6	1.2	6.9	11.2	0.3	....
Maximum,	78.5	2.0	3.0	16.8	26.0	1.0	....
Average,	68.4	1.2	1.9	11.0	17.0	0.5	15
Corn stover, † field cured:							
Minimum,	15.4	1.7	1.9	14.1	23.3	0.7	....
Maximum,	57.4	7.0	8.3	32.2	53.3	2.2	....
Average,	40.5	3.4	3.8	19.7	31.5	1.1	60
Hay from:							
Redtop,‡ cut at different stages—							
Minimum,	6.8	3.8	5.9	24.0	44.8	1.4	....
Maximum,	11.6	7.0	10.4	31.8	50.4	3.2	....
Average,	8.9	5.2	7.9	28.6	47.5	1.9	9
Redtop, cut in bloom—							
Minimum,	6.8	4.8	7.8	24.0	46.8	1.5	....
Maximum,	11.6	6.5	10.4	31.8	47.8	2.3	....
Average,	8.7	4.9	8.0	29.9	46.4	2.1	3
Orchard grass—							
Minimum,	6.5	5.0	6.6	28.9	32.9	1.7	....
Maximum,	13.6	7.9	10.4	38.3	48.6	3.3	....
Average,	9.9	6.0	8.1	32.4	41.0	2.6	10
Timothy,§ all analyses—							
Minimum,	6.1	2.5	3.8	22.3	34.3	1.0	....
Maximum,	28.9	6.3	9.8	38.5	58.5	4.0	....
Average,	13.2	4.4	5.9	29.0	45.0	2.5	68
Timothy, cut in full bloom—							
Minimum,	7.0	2.5	5.0	22.2	34.4	2.0	....
Maximum,	28.9	6.0	7.5	37.1	48.5	4.0	....
Average,	15.0	4.5	6.0	29.6	41.9	3.0	12

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*Entire plant.

†What is left after the ears are harvested.

‡Herd's grass of Pennsylvania.

§Herd's grass of New England and New York

Composition of Feeding Stuffs.—Continued.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
HAY AND DRY COARSE FODDER—Continued.							
Hay from:	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct	
Timothy cut soon after bloom—							
Minimum,	7.8	3.5	4.6	25.7	37.0	1.7	....
Maximum,	21.6	5.4	8.1	33.4	51.0	3.6	....
Average,	14.2	4.4	5.7	28.1	44.6	3.0	11
Timothy cut when nearly ripe—							
Minimum,	7.0	2.7	4.3	24.8	38.0	1.0	....
Maximum,	22.7	5.1	6.0	38.5	49.1	2.8	....
Average,	14.1	3.9	5.0	31.1	43.7	2.2	12
Minimum,	14.3	4.5	5.3	17.7	31.8	2.0	....
Maximum,	32.8	7.8	12.9	26.8	51.1	4.2	....
Average,	21.2	6.3	7.8	23.0	37.8	3.9	10
Cut when seed was in milk—							
Minimum,	22.5	5.6	6.0	23.9	33.2	3.4	....
Maximum,	26.5	7.6	6.6	24.9	35.4	4.1	....
Average,	24.4	7.0	6.2	24.5	24.2	3.6	4
Cut when seed was ripe—							
Minimum,	23.7	5.1	5.3	20.4	33.6	2.8	....
Maximum,	32.8	7.8	6.0	25.7	33.7	3.2	....
Average,	27.8	6.4	5.8	23.8	33.2	3.0	4
Hungarian grass—							
Minimum,	4.9	5.0	4.7	23.6	44.4	1.5	....
Maximum,	9.5	7.5	13.3	36.3	53.0	3.5	....
Average,	7.7	6.0	7.5	27.7	49.0	2.1	18
Meadow fescue—							
Minimum,	7.4	5.5	4.5	20.8	28.5	1.6	....
Maximum,	32.5	7.8	11.8	31.9	45.5	3.5	....
Average,	20.0	6.8	7.0	25.9	38.4	2.7	9
Italian rye grass—							
Minimum,	7.4	6.1	5.7	28.4	39.6	1.3	....
Maximum,	9.3	7.9	8.8	33.9	48.9	1.9	....
Average,	8.5	6.9	7.5	30.5	45.0	1.7	4
Mixed grasses—							
Minimum,	6.5	2.1	4.8	21.0	33.4	1.3	....
Maximum,	33.4	6.9	12.1	38.4	50.8	4.9	....
Average,	15.3	5.5	7.4	27.2	41.1	2.5	126
Hay from:							
Rowen (mixed)*							
Minimum,	8.2	5.1	9.6	20.1	33.6	2.2	....
Maximum,	24.4	7.2	14.8	20.0	44.3	4.5	....
Average,	16.6	6.8	11.6	22.5	39.4	3.1	23
Mixed grasses and clovers—							
Minimum,	8.2	3.9	5.5	19.7	31.8	1.5	....
Maximum,	15.9	9.6	14.4	35.1	48.9	3.1	....
Average,	12.9	5.5	10.1	27.6	41.3	2.6	17
Swamp hay—							
Minimum,	7.8	3.3	5.0	19.4	39.9	0.8	....
Maximum,	17.9	12.1	8.8	31.6	51.7	3.6	....
Average,	11.6	6.7	7.2	26.6	45.9	2.0	8
Salt marsh—							
Minimum,	7.8	5.4	4.0	25.1	34.1	1.6	....
Maximum,	18.6	11.8	7.8	33.8	54.3	3.1	....
Average,	10.4	7.7	5.5	30.0	44.1	2.4	10

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*Second cut.

Composition of Feeding Stuffs.—Continued.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
HAY AND DRY COARSE FODDER—Continued.							
Red clover—	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	
Minimum,	6.0	3.9	10.0	15.6	27.3	1.5	....
Maximum,	31.3	8.3	20.2	35.7	52.2	5.9	....
Average,	15.3	6.2	12.3	24.8	38.1	3.3	38
Red clover in bloom—							
Minimum,	6.0	5.6	10.8	17.9	27.3	2.5	....
Maximum,	31.3	8.3	15.4	28.1	41.3	5.9	....
Average,	20.8	6.6	12.4	21.9	33.8	4.5	6
Alsike clover—							
Minimum,	5.3	6.1	9.2	19.7	35.6	1.6	....
Maximum,	13.9	12.3	16.1	29.5	45.9	4.2	....
Average,	9.7	8.3	12.8	25.6	40.7	2.9	9
White clover—							
Minimum,	6.1	4.5	13.9	20.3	33.4	1.7	....
Maximum,	13.5	13.8	20.0	30.3	47.3	5.8	....
Average,	9.7	8.3	15.7	24.1	39.3	2.9	7
Crimson clover—							
Minimum,	5.9	7.4	13.6	20.1	29.3	1.5	....
Maximum,	13.4	13.0	16.1	34.9	42.6	4.8	....
Average,	9.6	8.6	15.2	27.2	36.6	2.8	7
Japan clover—							
Average,	11.0	8.5	13.8	24.0	39.0	3.7	2
Vetch—							
Minimum,	8.3	7.1	13.1	19.7	26.5	1.6	....
Maximum,	15.8	11.6	23.1	28.1	40.2	3.0	....
Average,	11.3	7.9	17.0	25.4	36.1	2.3	5
Serradella—							
Minimum,	7.2	5.4	13.9	19.4	40.5	2.2	....
Maximum,	11.7	10.3	16.6	22.9	46.0	2.9	....
Average,	9.2	7.2	15.2	21.6	44.2	2.6	2
Alfalfa*—							
Minimum,	4.6	3.1	10.2	14.0	35.1	1.1	....
Maximum,	16.0	10.4	23.3	33.0	53.6	3.8	....
Average,	8.4	7.4	14.3	25.0	42.7	2.2	21
Cowpea—							
Minimum,	7.6	3.2	13.6	16.4	39.4	1.1	....
Maximum,	14.0	10.2	20.3	25.0	49.5	3.7	....
Average,	10.7	7.5	16.6	20.1	42.2	2.2	8
Soja bean—							
Minimum,	6.1	4.8	14.0	17.3	31.8	2.4	....
Maximum,	20.1	8.9	18.1	32.3	41.0	7.5	....
Average,	11.3	7.2	15.4	22.3	38.6	5.2	6
Flat pea (Lathyrus sylvestris)—							
Minimum,	6.3	6.5	17.6	18.5	27.7	1.6	....
Maximum,	10.0	8.6	27.9	32.7	34.0	4.6	....
Average,	8.4	7.9	22.9	26.2	31.4	3.2	5
Peanut vines (without nuts)—							
Minimum,	6.3	7.3	9.1	18.3	33.1	1.7	....
Maximum,	7.8	15.7	11.7	33.3	50.4	5.8	....
Average,	7.6	10.8	10.7	23.6	42.7	4.6	6
Soja bean straw:							
Minimum,	5.7	3.9	4.0	34.0	35.3	0.8	....
Maximum,	14.0	4.9	4.9	49.6	43.3	3.2	....
Average,	10.1	5.8	4.6	40.4	37.4	1.7	4

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*Lucern.

Composition of Feeding Stuffs.—Continued.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
HAY AND DRY COARSE FODDER—Continued.							
Horse-bean straw:	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct	
Average,	9.2	8.7	8.8	37.6	34.3	1.4	1
Wheat straw:							
Minimum,	6.5	3.0	2.9	34.3	31.0	0.8	....
Maximum,	17.9	7.0	5.0	42.7	50.6	1.8	....
Average,	9.6	4.2	3.4	38.1	43.4	1.3	7
Rye straw:							
Minimum,	6.3	2.8	2.2	32.7	41.0	1.0	....
Maximum,	9.7	3.4	3.6	43.3	52.9	1.6	....
Average,	7.1	3.2	3.0	38.9	46.6	1.2	7
Oat straw:							
Minimum,	6.5	3.7	2.7	31.8	33.5	1.7	....
Maximum,	11.4	6.7	6.9	45.1	46.6	3.2	....
Average,	9.2	5.1	4.0	37.0	42.4	2.3	12
Buckwheat straw:							
Minimum,	9.0	4.9	3.3	37.2	32.1	0.7	....
Maximum,	10.4	6.5	7.8	46.8	38.9	1.7	....
Average,	9.9	5.5	5.2	43.0	35.1	1.3	3
ROOTS AND TUBERS.							
Potatoes:							
Minimum,	75.4	0.8	1.1	0.3	14.1	....	....
Maximum,	82.2	1.2	3.0	0.9	20.4	0.1	....
Average,	78.9	1.0	2.1	0.6	17.3	0.1	12
Sweet potatoes:							
Minimum,	66.0	0.7	0.5	0.6	18.0	0.3	....
Maximum,	74.4	1.3	3.6	2.5	29.7	0.6	....
Average,	71.1	1.0	1.5	1.3	24.7	0.4	6
Red beets:							
Minimum,	85.8	0.7	1.1	0.6	3.8	0.1	....
Maximum,	92.2	1.6	1.8	1.7	11.3	0.3	....
Average,	88.5	1.0	1.5	0.9	8.0	0.1	9
Sugar beets:							
Minimum,	85.0	0.4	1.1	0.6	5.7	0.1	....
Maximum,	90.8	1.2	3.2	1.3	13.6	0.2	....
Average,	86.5	0.9	1.8	0.9	9.8	0.1	19
Mangel-wurzels:							
Minimum,	86.9	0.8	1.0	0.6	2.4	0.1	....
Maximum,	94.4	1.4	1.9	1.3	8.7	0.5	....
Average,	90.9	1.1	1.4	0.9	5.5	0.2	9
Turnips:							
Minimum,	87.2	0.7	0.8	0.8	4.2	0.1	....
Maximum,	92.4	1.0	1.4	1.4	8.8	0.2	....
Average,	90.5	0.8	1.1	1.2	6.2	0.2	3
Rutabagas:							
Minimum,	87.1	1.0	1.0	1.1	5.1	0.1	....
Maximum,	91.8	1.4	1.3	1.4	9.1	0.3	....
Average,	88.6	1.2	1.2	1.3	7.5	0.2	4
Carrots:							
Minimum,	86.5	1.6	0.8	0.9	5.1	0.2	....
Maximum,	91.1	1.3	2.0	2.3	10.4	0.7	....
Average,	88.6	1.0	1.1	1.3	7.6	0.4	8
Artichokes:							
Average,	79.5	1.0	2.6	0.8	15.9	0.2	2

Composition of Feeding Stuffs.—Continued.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
GRAINS AND OTHER SEEDS.							
Corn kernels:	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	
Dent, all analyses—							
Minimum,	6.2	1.0	7.5	0.9	65.9	3.1	....
Maximum,	19.4	2.6	11.8	4.8	75.7	7.5	....
Average,	10.6	1.5	10.3	2.2	70.4	5.0	86
Flint, all analyses—							
Minimum,	4.5	1.0	7.0	0.7	65.0	3.4	....
Maximum,	19.6	1.9	13.7	2.9	76.7	7.1	....
Average,	11.3	1.4	10.5	1.7	70.1	5.0	68
Sweet, all analyses—							
Minimum,	6.0	1.4	9.5	1.5	61.8	3.8	....
Maximum,	10.9	2.4	15.3	5.2	72.4	9.3	....
Average,	8.8	1.9	11.6	2.8	66.8	8.1	26
Pop varieties—							
Minimum,	8.6	1.2	9.7	1.2	68.4	4.2	....
Maximum,	11.8	1.7	13.1	2.3	71.1	6.0	....
Average,	10.7	1.5	11.2	1.8	69.6	5.2	4
Soft varieties—							
Minimum,	6.1	1.4	8.8	1.3	66.0	5.0	....
Maximum,	14.1	1.9	14.6	3.3	75.5	5.7	....
Average,	9.3	1.6	11.4	2.0	70.2	5.5	5
All varieties and analyses—							
Minimum,	4.5	1.0	7.0	0.7	61.8	3.1	....
Maximum,	20.7	2.6	15.3	5.2	76.7	9.3	....
Average,	10.9	1.5	10.5	2.1	69.6	5.4	208
Sorghum seed:							
Minimum,	9.3	1.4	7.7	1.5	59.0	2.1	....
Maximum,	16.8	4.3	11.3	8.7	73.6	4.6	....
Average,	12.8	2.1	9.1	2.6	69.8	3.6	10
Barley:							
Minimum,	7.2	1.8	8.6	1.3	66.7	1.5	....
Maximum,	12.6	3.2	15.7	4.2	73.9	3.2	....
Average,	10.9	2.4	12.4	2.7	69.8	1.8	10
Oats:							
Minimum,	8.9	2.0	8.0	1.5	53.5	3.4	....
Maximum,	13.5	4.0	14.4	12.9	66.9	5.8	....
Average,	11.0	3.0	11.8	9.5	59.7	5.0	30
Rye:							
Minimum,	8.7	1.8	9.5	1.4	71.2	1.4	....
Maximum,	13.2	1.9	12.1	2.1	73.9	2.1	....
Average,	11.6	1.9	10.6	1.7	72.5	1.7	6
Wheat, spring varieties:							
Minimum,	8.1	1.5	8.4	1.3	66.1	1.8	....
Maximum,	13.4	2.6	15.4	2.3	74.9	2.6	....
Average,	10.4	1.9	12.5	1.8	71.2	2.2	13
Wheat, winter varieties, all analyses:							
Minimum,	7.1	0.8	8.1	0.4	66.7	1.3	....
Maximum,	14.0	3.6	16.6	2.9	77.7	3.9	....
Average,	10.5	1.8	11.8	1.8	72.0	2.1	262
Wheat, all varieties:							
Minimum,	7.1	0.8	8.1	0.4	64.8	1.3	....
Maximum,	14.0	3.6	17.2	3.1	77.7	1.3	....
Average,	10.5	1.8	11.9	1.8	71.9	2.1	310
Rice:							
Minimum,	11.4	0.3	5.9	0.1	77.5	0.3	....
Maximum,	14.0	0.5	8.6	0.4	80.6	0.6	....
Average,	12.4	0.4	7.4	0.2	79.2	0.4	10

Composition of Feeding Stuffs.—Continued.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
GRAINS AND OTHER SEED—Continued.							
Buckwheat:	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct	
Minimum,	10.9	1.6	8.6	7.8	62.6	2.2	....
Maximum,	14.8	2.3	11.0	9.4	65.4	2.4	....
Average,	12.6	2.3	10.0	8.7	64.5	2.2	8
Sunflower seed (whole):							
Minimum,	8.5	2.1	15.8	29.5	22.0	20.9	....
Maximum,	8.8	3.2	16.7	30.3	27.7	21.5	....
Average,	8.6	2.6	16.3	29.9	21.4	21.2	2
Cotton seed, whole (with hulls):							
Minimum,	7.0	2.9	14.5	20.3	17.3	18.9	....
Maximum,	17.5	4.5	21.7	28.7	29.1	21.6	....
Average,	10.3	3.5	18.4	23.2	24.7	19.9	5
Cotton seed kernels (without hulls):							
Minimum,	6.0	4.0	29.3	3.1	15.8	36.5	....
Maximum,	6.3	5.4	33.1	4.4	19.5	36.6	....
Average,	6.2	4.7	31.2	3.7	17.6	36.6	2
Cotton seed, whole, (roasted):							
Minimum,	2.9	2.3	16.1	16.8	21.1	22.5	....
Maximum,	9.3	8.7	17.6	24.0	25.8	32.7	....
Average,	6.1	5.5	16.8	20.4	23.5	27.7	2
Peanut kernel (without hulls):							
Minimum,	4.9	1.9	23.2	2.0	12.7	35.0	....
Maximum,	13.2	3.8	31.4	18.4	19.1	47.4	....
Average,	7.5	2.4	27.9	7.0	15.6	39.6	7
Horse bean,	11.3	3.8	26.6	7.2	50.1	1.0	1
Soja bean:							
Minimum,	5.9	3.1	26.3	3.4	26.2	12.3	....
Maximum,	19.3	5.4	40.2	6.1	32.8	19.0	....
Average,	10.8	4.7	34.0	4.8	28.8	16.9	8
Cowpea:							
Minimum,	10.0	2.9	19.3	2.5	50.5	1.3	....
Maximum,	20.9	3.4	23.4	5.0	62.0	1.6	....
Average,	14.8	3.2	20.8	4.1	55.7	1.4	5
MILL PRODUCTS.							
Corn meal:							
Minimum,	8.0	0.9	7.1	0.5	60.4	2.0	....
Maximum,	27.4	4.1	13.9	3.1	74.0	5.1	....
Average,	15.0	1.4	9.2	1.9	68.7	3.8	77
Corn and cob meal:							
Minimum,	9.5	1.2	5.8	4.7	56.8	2.5	....
Maximum,	26.3	1.9	12.2	9.4	60.7	4.7	....
Average,	15.1	1.5	8.5	6.6	64.8	3.5	7
Oat meal:							
Minimum,	6.2	1.8	12.9	0.6	66.6	6.1	....
Maximum,	8.8	2.2	16.3	1.2	69.0	8.8	....
Average,	7.9	8.0	14.7	0.9	67.4	7.1	6
Barley meal:							
Minimum,	9.9	1.6	9.8	5.9	63.5	1.5	....
Maximum,	13.6	3.8	12.7	7.0	68.0	3.2	....
Average,	11.9	2.6	10.5	6.5	66.3	2.2	3
Rye flour:							
Minimum,	12.4	0.6	0.4	6.0	77.6	0.8	....
Maximum,	13.6	0.8	6.9	0.5	79.1	0.9	....
Average,	13.1	0.7	6.7	0.4	78.3	0.8	4

Composition of Feeding Stuffs.—Continued.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
MILL PRODUCTS—Continued.							
Wheat flour, all analyses:	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	
Minimum,	8.2	0.3	8.6	0.1	71.5	0.6	....
Maximum,	13.6	0.7	13.6	1.0	78.5	1.8	....
Average,	12.4	0.5	10.8	0.2	75.0	1.1	20
Buckwheat flour:							
Minimum,	12.8	0.7	4.2	0.2	71.1	0.7	....
Maximum,	17.6	1.3	8.1	0.5	79.4	1.8	....
Average,	14.6	1.0	6.9	0.3	75.8	1.4	4
Ground linseed:							
Minimum,	7.9	3.4	20.3	5.0	25.5	30.3	....
Maximum,	8.3	6.1	23.0	6.9	30.2	30.5	....
Average,	8.1	4.7	21.6	7.3	27.9	30.4	2
Pea meal:							
Minimum,	8.9	2.6	19.1	17.1	50.2	0.9	....
Maximum,	12.1	2.7	21.4	17.7	52.0	1.5	....
Average,	10.5	2.6	20.2	14.4	15.1	1.2	2
Soja-bean meal,	10.8	45.5	36.7	4.5	27.3	16.2	1
Ground corn and oats, equal parts:							
Minimum,	10.7	1.9	8.4	....	*70.4	4.0	....
Maximum,	13.1	2.7	10.4	....	*73.4	5.0	....
Average,	11.9	2.2	9.6	....	*72.0	4.4	6
WASTE PRODUCTS.							
Corncob:							
Minimum,	7.2	0.7	1.2	18.2	43.8	0.1	....
Maximum,	24.8	2.7	3.7	38.3	66.7	0.9	....
Average,	10.7	1.4	2.4	30.1	54.9	0.5	18
Hominy chops:							
Minimum,	8.1	1.9	7.9	2.5	61.0	4.5	....
Maximum,	13.5	3.1	11.2	6.7	71.1	11.2	....
Average,	11.1	2.5	9.8	3.8	64.5	8.3	12
Corn-germ:							
Minimum,	9.4	1.9	9.7	1.9	61.9	5.2	....
Maximum,	13.0	7.4	9.9	5.8	67.4	11.2	....
Average,	10.7	4.0	9.8	4.1	64.0	7.4	3
Corn-germ meal:							
Minimum,	6.5	0.8	10.0	7.8	57.4	4.3	....
Maximum,	9.9	2.6	14.0	13.0	67.0	11.2	....
Average,	8.1	1.3	11.1	9.9	62.5	7.1	6
Gluten meal:							
Minimum,	6.2	0.5	21.3	0.3	34.0	3.4	....
Maximum,	12.3	2.0	39.2	7.8	58.5	20.0	....
Average,	8.8	0.8	29.7	2.2	49.8	8.7	54
Recent analyses—							
Minimum,	6.2	0.5	21.4	0.6	34.0	6.6	....
Maximum,	11.1	2.0	39.3	7.8	58.4	20.0	....
Average,	8.2	0.9	29.3	3.3	46.5	11.8	20
Chicago†—							
Average,	10.1	1.1	30.1	1.6	48.7	8.4	6
Buffalo†—							
Average,	8.2	0.8	23.3	6.1	50.4	11.2	5
Cream gluten:							
Minimum,	7.7	0.6	34.1	1.2	35.0	13.6	....
Maximum,	9.0	0.8	38.2	1.3	41.1	15.8	....
Average,	8.1	0.7	36.1	1.3	39.0	14.8	3

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*Including fiber.

†Included in above average.

Composition of Feeding Stuffs.—Continued.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
WASTE PRODUCTS—Continued.							
Gluten feed:	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	
Minimum,	6.3	0.7	19.5	1.5	44.5	7.0	....
Maximum,	9.0	1.8	28.3	8.2	58.0	12.6	....
Average,	7.8	1.1	24.0	5.3	41.2	10.6	11
Buffalo†—							
Average,	7.7	1.1	25.0	5.3	49.3	11.6	5
Pope's,	14.0	0.6	33.3	1.6	36.5	14.1	1
Peoria,†	7.5	0.8	19.8	8.2	51.1	12.6	1
Chicago maize feed:							
Minimum,	8.6	0.7	19.3	6.8	49.2	5.6	....
Maximum,	9.7	1.1	26.9	8.7	56.1	7.9	....
Average,	9.1	0.9	22.8	7.6	52.7	6.9	3
Glucose feed and glucose refuse:							
Average,	6.5	1.1	20.7	4.5	56.8	10.4	2
Dried starch feed and sugar feed:							
Minimum,	9.2	0.6	17.1	3.1	49.2	7.3	....
Maximum,	11.7	1.2	22.1	5.6	59.6	11.1	....
Average,	10.9	0.9	19.7	4.7	54.8	9.0	4
Starch feed, wet:							
Minimum,	62.3	0.1	3.6	1.6	18.7	1.3	....
Maximum,	72.2	0.6	9.6	4.4	28.9	4.4	....
Average,	65.4	0.3	6.1	3.1	22.0	3.1	12
Oat feed:							
Minimum,	6.4	3.2	12.6	3.7	56.2	6.1	....
Maximum,	9.2	4.2	20.0	12.5	63.7	7.8	....
Average,	7.7	3.7	16.0	6.1	59.4	7.1	4
Barley screenings:							
Minimum,	12.0	3.5	12.1	7.0	61.6	2.6	....
Maximum,	12.4	3.6	12.5	7.6	62.0	2.9	....
Average,	12.2	3.6	12.3	7.3	61.8	2.8	2
Malt sprouts:							
Minimum,	7.3	3.8	21.0	9.3	45.5	1.0	....
Maximum,	12.0	6.7	25.9	12.0	50.3	3.0	....
Average,	10.2	5.7	23.2	10.7	48.5	1.7	4
Brewers' grains, wet:							
Minimum,	68.6	0.3	4.3	3.1	9.6	0.8	....
Maximum,	79.4	1.5	6.9	5.6	15.9	2.8	....
Average,	75.7	1.0	5.4	3.8	12.5	1.6	15
Brewers' grains, dried:							
Minimum,	6.2	3.3	19.3	10.2	46.1	4.2	....
Maximum,	11.9	3.8	20.3	11.6	56.8	6.5	....
Average,	8.2	3.6	19.9	11.0	51.7	5.6	3
Grano gluten,	5.8	2.8	31.1	12.0	33.4	14.9	1
Rye bran:							
Minimum,	8.2	2.9	11.5	2.5	59.8	1.7	....
Maximum,	13.7	4.5	16.8	4.1	67.6	4.9	....
Average,	11.6	3.6	14.7	3.5	63.8	2.8	7
Wheat bran from spring wheat:							
Minimum,	7.4	4.0	14.3	5.4	51.7	3.6	....
Maximum,	13.6	6.0	18.1	10.1	58.1	5.0	....
Average,	11.5	5.4	16.1	8.0	54.5	4.5	10
Wheat bran from winter wheat:							
Minimum,	10.6	5.0	13.9	7.2	50.5	3.5	....
Maximum,	13.6	6.4	17.8	8.9	56.2	4.5	....
Average,	12.3	5.9	16.0	8.1	53.7	4.0	7

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†Included in above average.

Composition of Feeding Stuffs.—Continued.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
WASTE PRODUCTS—Continued.							
Wheat bran, all analyses:	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	
Minimum,	7.4	2.5	12.1	2.4	45.5	1.5	......
Maximum,	15.8	7.8	18.9	15.5	63.2	7.0	....
Average,	11.9	5.8	15.4	9.0	53.9	4.0	88
Wheat middlings:							
Minimum,	9.2	1.4	10.1	1.3	53.0	2.1	....
Maximum,	16.0	6.3	20.0	12.7	70.9	5.9	....
Average,	12.1	3.3	15.6	4.6	60.4	4.0	32
Wheat shorts:							
Minimum,	4.1	2.0	11.1	6.0	50.0	2.5	....
Maximum,	15.5	6.2	19.4	10.5	67.0	6.1	....
Average,	11.8	4.6	14.9	7.4	56.8	4.5	12
Wheat screenings:							
Minimum,	7.8	1.9	8.3	1.7	61.0	2.7	....
Maximum,	13.6	3.8	16.9	7.5	70.4	3.3	....
Average,	11.6	2.9	12.5	4.9	65.1	3.0	10
Rice bran:							
Minimum,	8.8	8.4	10.9	2.0	41.9	5.2	....
Maximum,	10.7	12.4	13.6	17.8	62.3	10.9	....
Average,	9.7	10.0	12.1	9.5	49.9	8.8	5
Rice hulls:							
Minimum,	7.7	10.5	2.9	30.3	36.0	0.6	....
Maximum,	8.5	15.1	4.7	38.6	41.6	0.9	....
Average,	8.2	13.2	3.6	35.7	38.6	0.7	3
Rice polish:							
Minimum,	9.0	2.8	10.9	2.4	45.5	6.5	....
Maximum,	11.2	11.3	12.9	14.5	63.3	8.0	....
Average,	10.0	6.7	11.7	6.3	58.0	7.3	4
Buckwheat middlings:							
Minimum,	9.5	4.4	25.1	2.4	36.3	5.7	....
Maximum,	16.3	5.5	31.3	5.7	52.7	8.1	....
Average,	13.2	4.8	28.9	4.1	41.9	7.1	....
Cotton seed meal:							
Minimum,	5.8	5.7	23.3	1.3	15.7	8.8	....
Maximum,	18.5	8.8	50.8	10.1	38.7	18.0	....
Average,	8.2	7.2	42.3	5.6	23.6	13.1	35
Cotton seed hulls:							
Minimum,	9.2	1.8	2.2	37.9	12.4	0.6	....
Maximum,	16.7	4.4	5.4	67.0	41.8	5.4	....
Average,	11.1	2.8	4.2	46.3	33.4	2.2	20
Linseed meal, old process:							
Minimum,	5.6	4.6	27.7	4.7	28.4	5.2	....
Maximum,	12.4	8.2	38.2	12.9	41.9	11.6	....
Average,	9.2	5.7	32.9	8.9	35.4	7.9	21
Linseed meal, new process:							
Minimum,	6.0	5.0	27.1	7.6	35.2	1.3	....
Maximum,	13.4	6.9	38.4	4.0	48.0	4.4	....
Average,	10.1	5.8	38.2	9.5	38.4	3.0	14
Peanut meal:*							
Minimum,	6.6	3.7	37.5	2.5	28.5	5.8	....
Maximum,	15.4	5.5	52.4	7.4	30.8	17.5	....
Average,	10.7	4.9	47.6	5.1	23.7	8.0	2,480
Peanut hulls:							
Minimum,	7.8	1.9	4.6	56.5	9.7	0.9	....
Maximum,	10.8	4.6	8.6	72.3	18.9	2.0	....
Average,	9.0	3.4	6.6	64.3	15.1	1.6	5

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*Mostly European analyses.

Composition of Feeding Stuffs.—Continued.

	Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	Number of analyses.
MILK AND ITS BY-PRODUCTS.							
Whole milk:	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	
Minimum,	80.3	0.4	2.1	....	2.1	1.7	....
Maximum,	90.7	1.2	6.4	....	6.1	6.5	....
Average,	87.2	0.7	3.6	....	4.9	3.7	798
Skim milk, cream raised by setting:							
Minimum,	88.3	0.5	2.6	....	3.8	0.2	....
Maximum,	92.6	1.0	3.9	....	5.5	2.5	....
Average,	90.4	0.7	3.3	....	4.7	0.9	96
Skim milk, cream raised by separator:							
Minimum,	89.8	....	....	....	....	....	....
Maximum,	91.2	....	....	....	....	....	....
Average,	90.6	0.7	3.1	....	5.3	0.3	7
Butter milk:							
Minimum,	82.2	0.4	1.7	....	2.5	....	....
Maximum,	93.3	0.9	6.2	....	5.6	5.4	....
Average,	90.1	0.7	4.0	....	4.0	1.1	85
Whey:							
Minimum,	93.2	0.3	0.3	....	4.4	0.0	....
Maximum,	94.6	0.6	1.2	....	5.8	0.2	....
Average,	93.8	0.4	0.6	....	5.1	0.1	46

APPENDIX.

FOOD CONTROL LAWS OF THE VARIOUS STATES:

- CONNECTICUT.
- MAINE.
- MASSACHUSETTS.
- NEW JERSEY.
- NEW YORK.
- PENNSYLVANIA.
- RHODE ISLAND.
- VERMONT.

FOOD CONTROL LAWS OF THE VARIOUS STATES.

Connecticut.

An act concerning the regulation of the sale of concentrated commercial feeding stuffs.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. Every lot or parcel of concentrated commercial feeding stuff, as defined in section three of this act, used for feeding domestic animals, sold, offered, or exposed for sale within this State, shall have affixed thereto in a conspicuous place on the outside thereof, a legible and plainly printed statement, clearly and truly certifying the number of net pounds of feeding stuff contained therein, the name, brand, or trade-mark under which the article is sold, the name and address of the manufacturer or importer and a statement of the percentage it contains of crude fat and of crude protein, allowing one per cent. of nitrogen to equal six and one-fourth per cent. of protein, both constituents to be determined by the methods adopted at the time by the Association of Official Agricultural Chemists of the United States.

Section 2. The term concentrated commercial feeding stuffs as herein used shall not include hays and straws, the whole seeds nor the unmixed meals made directly from the seed of wheat, rye, barley, oats, Indian corn, buckwheat or broom corn.

Section 3. The term concentrated commercial feeding stuff as herein used shall include linseed meals, cotton seed meals, pea meals, cocoanut meals, gluten meals, gluten feeds, maize feeds, starch feeds, sugar feeds, dried brewers' grains, malt sprouts, hominy feeds, cerealine feeds, rice meals, oat feeds, corn and oat chops, corn and oat feeds, ground beef or fish scraps, mixed feeds, provender, bran, middlings, and mixed feeds made wholly or in part from wheat, rye or buckwheat, and all materials of a similar nature not included in section two of this act.

Section 4. Each and every manufacturer, importer, agent, or seller of any concentrated commercial feeding stuff shall, upon request, file with the Connecticut Agricultural Experiment Station a certified copy of the statement named in section one of this act.

Section 5. Each and every manufacturer, importer, agent, or person selling, offering, or exposing for sale in this State any concentrated commercial feeding stuff, as defined in section three of this act, without the statement required by section one of this act, and stating that said feeding stuff contains substantially a larger percentage of either of the constituents mentioned in section one than is contained therein, or in relation to which the provisions of all of the foregoing sections have not been fully complied with, shall be fined not exceeding one hundred dollars for the first offense and not exceeding two hundred dollars for each subsequent offense.

Section 6. The Connecticut Agricultural Experiment Station is hereby authorized to have collected a sample not exceeding two pounds in weight, for analysis from any lot, parcel, or package of concentrated commercial feeding stuff as defined by section three of this act, or unmixed meals, brans, or middlings named in section two of this act, which may be in the possession of any manufacturer, importer, agent, or dealer, but said sample shall be taken in the presence of said party or parties in interest or their representatives, and taken from a number of parcels or packages which shall be not less than five per cent. of the whole lot inspected, and shall be thoroughly mixed, divided into two samples, placed in glass vessels, carefully sealed, and a label placed on each stating the name or brand of the feeding stuff or material sampled, the names of the party from whose stock the sample was taken and the time and place of taking the same, and said label shall be signed by said chemist or his deputy, and by the party or parties in interest or their representatives present at the taking and sealing of said sample; one of said samples shall be retained by said chemist or his deputy and the other by the party whose stock is sampled. Said Connecticut Agricultural Experiment Station shall cause at least one sample of each brand of feeding stuff collected as herein provided to be analyzed annually by or under the direction of said chemist. Said analysis shall include determinations of crude fat and crude protein and such other determinations as may at any time be deemed advisable. Said Connecticut Agricultural Experiment Station shall cause the analysis so made to be published in Station bulletins, together with such other additional information in relation to the character, composition, and use thereof as may seem to be of importance, and issue the same annually, or more frequently, if deemed advisable.

Section 7. It shall be the duty of the Dairy Commissioner to attend to the enforcement of this act, and when any evidence is submitted by the Connecticut Agricultural Experiment Station that the provisions of this act have been violated, he shall make complaint to the proper prosecuting officer, to the end that the violator may be prosecuted.

Section 8. The term importer for all the purposes of this act is intended to apply to such person or persons as shall bring into or offer for sale within this State, concentrated commercial feeding stuffs manufactured without this State.

Section 9. This bill shall not apply to feed ground from whole grain and sold directly from manufacturer to consumer.

Section 10. All acts or parts of acts inconsistent herewith are hereby repealed.

Section 11. This act shall take effect on and after July first, 1899.

Approved June 20, 1899.

Maine.

An act to regulate the sale and analysis of concentrated commercial feeding stuff.

Section 1. Every manufacturer, company or person who shall sell, offer or expose for sale or for distribution in this State any concentrated commercial feeding stuff, as defined in section three of this act, used for feeding farm live stock, shall, in addition to the tax tag, described in section five of this act, affix to every package of such feeding stuff in a conspicuous place on the outside thereof, a plainly printed statement clearly and truly certifying the number of net pounds in package sold or offered for sale, the name or trade mark under which the article was sold, the name of manufacturer or shipper, the place of manufacture, the place of business and the chemical analysis stating the percentage of crude protein, allowing one per cent. of nitrogen to equal six and one-fourth per cent. of protein, and of crude fat it contains, both constituents to be determined by the methods adopted at the time by the Association of Official Agricultural Chemists.

Section 2. The term concentrated commercial feeding stuff, as here used, shall not include hays and straws, the whole seeds nor the unmixed meal made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat and broom corn. Neither shall it include wheat, rye and buckwheat brans or middlings not mixed with other substances, but sold separately, as distinct articles of commerce, nor pure grains ground together.

Section 3. The term concentrated commercial feeding stuff, as here used, shall include linseed meals, cotton seed meals, pea meals, cocoanut meals, gluten meals, gluten feed, maize feeds, starch feeds, sugar feeds, dried brewers' grains, malt sprouts, hominy feeds, cerealine feeds, rice meals, oat feeds, corn-and-oat chops, ground beef or fish scraps, mixed feeds and all other materials of similar nature not included within section two of this act.

Section 4. Before any manufacturer, company or persons shall sell or offer or expose for sale in this State any concentrated commercial feeding stuffs as defined in section three of this act, he or they shall for each and every feeding stuff bearing a distinguishing name or trade mark, file with the Director of the Maine Agricultural Experiment Station a certified copy of the statement named in section one of this act, said certified copy to be accompanied, when the Director shall so request, by sealed glass jar or bottle containing at least one pound of feeding stuff to be sold or offered for sale, and the company or person furnishing said sample shall thereupon make affidavit that said sample corresponds within reasonable limits to the feeding stuffs it represents, in the percentage of protein and fat which it contains.

Section 5. Each manufacturer, importer, agent or seller of any concentrated commercial feeding stuff, as defined in section three of this act, shall pay to the Director of the Maine Agricultural Experiment Station an inspection tax of ten cents per ton for each ton of such concentrated feeding stuff sold or offered for sale in the State of Maine, and shall affix to each car shipped in bulk and to each bag, barrel or other package of such concentrated feeding stuff, a tag to be furnished by said Director, stating that all charges specified in this section have been paid. The Director of said Experiment Station is hereby empowered to prescribe the forms for such tags, and adopt such regulations as may be necessary for the enforcement of the law. Whenever the manufacturer or importer or shipper of a concentrated feeding stuff shall have filed the statement made in section one of this act and paid the inspection tax, no agent or seller of said manufacturer, importer or shipper shall be required to file such statements or pay such tax. The amount of the inspection tax received by said Director shall be paid by him into the treasury of the Maine Agricultural Experiment Station. The treasurer of said Station shall make an annual report of the receipts and expenditures of funds from this inspection tax, and all receipts in excess of three thousand dollars shall be carried into the State treasury.

Section 6. Any manufacturer, importer or person who shall sell, or offer or expose for sale or for distribution in this State any concentrated commercial feeding stuffs, as defined in section three of this act, without complying with the requirements of the preceding section of this act, or any feeding stuff which contains substantially a smaller percentage of constituents than are certified to be contained, shall, on conviction in a court of competent jurisdiction, be fined not more than one hundred dollars for the first offense, and not more than two hundred dollars for each subsequent offense.

Section 7. The Director of the Maine Experiment Station shall annually analyze, or cause to be analyzed, at least one sample to be taken in the manner hereinafter prescribed of every concentrated commercial feeding stuff sold or offered for sale under the provisions of this act. Said Director is hereby authorized and directed in person or by deputy to take a sample, not exceeding two pounds in weight, for said analysis from any lot or package of concentrated commercial feeding stuff which may be in the possession of any manufacturer, importer, agent or dealer in this State; but said sample shall be drawn in the presence of said party or parties in interest, or their representatives, and taken from a parcel or a number of packages, which shall not be less than ten per cent. of the whole lot sampled and shall be thoroughly mixed, and then divided into two equal samples, and placed in glass vessels, and carefully sealed and a label placed on each, stating the name of brand of the feeding stuff or material sampled, the name of the party from whose stock the sample was drawn and the time and place of drawing, and said label shall also be signed by the Director, or his deputy, and by the party or parties in interest or their representatives at the drawing and sealing of said samples; one of said duplicate samples shall be retained by the Director and the other by the party whose stock was sampled; and the sample or samples retained by the Director shall be for comparison with the certified statement named in section four of this act. The result of the analysis of the sample or samples so procured, together with such additional information as circumstances advise, shall be published in the report or bulletins from time to time.

Section 8. Whenever the Director becomes cognizant of the violation of any of the provisions of this act, he shall report such violation to the Secretary of the Board of Agriculture, and said Secretary shall prosecute the party or parties thus reported; but it shall be the duty of said Secretary, upon thus ascertaining any violation of this act, to forthwith notify the manufacturer, importer or dealer in writing, and give him not less than thirty days thereafter in which to comply with the requirements of this act; but there shall be no prosecution in relation to the quality of any concentrated commercial feeding stuff if the same shall be found substantially equivalent to the certified statement named in section four of this act.

Section 9. All acts and parts of acts inconsistent with this act are hereby repealed.

Section 10. This act shall take effect October the 1st, 1897.

Massachusetts.

An act relative to concentrated commercial feed stuffs.

Section 1. The Director of the Hatch Experiment Station of the Massachusetts Agricultural College is hereby authorized and directed in person or by deputy, to take samples not exceeding two pounds in weight from any lot or package of concentrated commercial feed stuff, used for feeding any kind of farm live stock, which may be in the possession of any manufacturer, importer, agent or dealer, cause the same to be analyzed for the amount of crude protein and crude fat contained therein, as well as for other ingredients if thought advisable, and cause the results of the analyses to be published from time to time in specially prepared bulletins, with such additional information as circumstances advise: Provided, however, That in publishing the results of the analyses the names of the jobbers or local dealers selling the said feed stuffs shall not be used, but the commodity analyzed shall be identified and described by the name of the manufacturer and the commercial name or designation by which it is known in the trade.

Section 2. Whenever requested said samples shall be taken in the presence of the party or parties in interest or their representatives and shall in all cases be taken from a parcel or number of packages which shall not be less than five per cent. of the whole lot inspected, shall be thoroughly mixed and then divided into two equal samples and put in glass vessels and carefully sealed, and a label placed on each vessel stating the name or brand of the feed stuff or material sampled, the name of the manufacturer when possible, the name of the party from whose stock the sample was taken, and the time and place of taking; said label shall be signed by the Director, or his deputy, and by the party or parties in interest or their representatives, if present at the taking and sealing of the samples. One of said duplicate samples shall be retained by the Director and the other by the party whose stock was sampled.

Section 3. This act shall take effect on the first day of July in the year eighteen hundred and ninety-seven. (Approved March 5, 1897.)

New Jersey.

Be it enacted by the Senate and General Assembly of the State of New Jersey:

1. Every lot or parcel of concentrated commercial feeding stuff as defined in section two of this act, used for feeding domestic animals, sold, offered or exposed for sale within this State, shall have affixed thereto, in a conspicuous place on the outside thereof a legible and plainly printed statement, clearly and truly certifying the number of net pounds of feeding stuff contained therein, the name, brand

or de mark under which the article is sold, the name and address of the manufacturer or importer, and a statement of the percentage it contains of crude fat and of crude protein, allowing one per centum of nitrogen to equal six and one-fourth per centum of protein, both constituents to be determined by the methods of the Association of Official Agricultural Chemists of the United States; but if the feeding stuff is sold in bulk or in packages belonging to the purchaser, the agent or dealer, upon request of the purchaser, shall furnish to him the certified statement named in this section.

2. The term concentrated commercial feeding stuff used in this act shall include linseed meal, cotton seed meals, pea meals, peanut meals, cocoanut meals, gluten meals, gluten feeds, maize feeds, starch feeds, sugar feeds, dried brewers' grains, malt sprouts, hominy feeds, cerealine feeds, rice meals, oat feeds, corn and oat chop, ground beef or fish scraps, mixed feeds, and all other materials of similar nature.

3. The term concentrated commercial feeding stuffs shall not include hays and straws, the whole seeds nor the unmixed meals made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat and broom corn; neither shall it include wheat, rye and buckwheat brans or middlings, not mixed with other substances, but sold separately, as distinct articles of commerce, nor pure grains ground together.

4. Each and every manufacturer, importer, agent or seller of any concentrated commercial feeding stuff shall, during the month of November, file with the New Jersey Agricultural Experiment Station a certified copy of the statement named in section one of this act and, upon request, shall furnish a sealed glass jar or bottle containing a representative sample of at least one pound of the feeding stuff to be sold or offered for sale.

5. Each and every manufacturer, importer, agent or person selling, offering or exposing for sale in this State any concentrated commercial feeding stuff, as defined in section two of this act, without the statement required by section one of this act, or stating that said feeding stuff contains substantially a larger percentage of either of the constituents mentioned in section one than is contained therein, or in relation to which the provisions of all the foregoing sections have not been fully complied with, shall be fined not exceeding one hundred dollars for the first offense, and not exceeding two hundred dollars for each subsequent offense.

6. Any person who shall adulterate any kind of meal or ground grain with milling or manufacturing offals, or any other substance whatever, for the purpose of sale, unless the true composition, mixture or adulteration thereof is plainly marked or indicated upon the package containing the same, or in which it is offered for sale or any

person who knowingly sells or offers for sale any meal or ground grain which has been so adulterated, unless the true composition, mixture, or adulteration is plainly marked or indicated upon the package containing the same, or in which it is offered for sale shall be fined not less than twenty-five dollars nor more than one hundred dollars for each offense.

7. All penalties imposed under this act shall be paid into the treasury of this State, for the purpose of defraying the expenses of the prosecution.

8. The New Jersey Agricultural Experiment Station is hereby authorized to have collected a sample, not exceeding two pounds in weight, for analysis, from any lot, parcel or package of any concentrated commercial feeding stuff as defined by section two of this act, or any kind of material which is used in the feeding of domestic animals, and which may be in the possession of any manufacturer, importer, agent or dealer, but said sample shall be taken in the presence of said party or parties in interest, or their representatives, and taken from a number of parcels or packages which shall not be less than five per centum of the whole lot inspected, and shall be thoroughly mixed, divided into two samples, placed in glass vessels, carefully sealed, and a label placed on each stating the name or brand of the feeding stuff or material sampled, the name of the party from whose stock the sample was taken, and the time and place of taking the same, and said label shall be signed by the collector or his deputy, and by the party or parties in interest or their representatives present at the taking and sealing of said samples; one of said samples shall be retained by the collector or his deputy, and the other by the party whose stock is sampled; said New Jersey Agricultural Experiment Station shall cause at least one sample of each brand of feeding stuff collected as herein provided to be analyzed annually; said analysis shall include determinations of crude fat and crude protein, and such other determinations as may at any time be deemed advisable; said New Jersey Agricultural Experiment Station shall cause the analysis so made to be published in Station bulletins, together with such other additional information in relation to the character, composition and use thereof as may seem to be of importance, and issue the same annually, or more frequently, if deemed advisable.

9. Whenever the New Jersey Agricultural Experiment Station becomes cognizant of the violation of any of the provisions of this act, such violation shall be reported to the Secretary of the State Board of Agriculture, and said Secretary of the State Board of Agriculture shall make complaint to the proper prosecuting officer to the end that the violator may be prosecuted.

10. The term importer for all the purposes of this act is intended to apply to such person or persons as shall bring into or offer for sale within this State, concentrated commercial feeding stuffs manufactured without this State.

11. The expenses incurred by the New Jersey Agricultural Experiment Station in carrying out the provisions of this act, when presented to the comptroller of the State, accompanied by the proper vouchers, duly certified by the President and Secretary of the Board of Managers, shall upon warrant of said comptroller be paid out of the State treasury: Provided, Such expenses do not exceed the sum of three thousand dollars in any year.

12. This act shall take effect when the sum provided for expenses in section eleven has been duly appropriated.

Passed March 15, 1900.

New York.

The people of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Chapter three hundred and thirty-eight of the laws of eighteen hundred and ninety-three, entitled "An act in relation to agriculture, constituting articles one, two, three, four and five of chapter thirty-three of the general laws," is hereby amended by adding at the end thereof a new article to be known as article nine, and to read as follows:

Article IX.

Sale and analysis of concentrated commercial feeding stuffs.

Section 120. Term "concentrated commercial feeding stuffs" defined.

Section 121. Statements to be attached to packages; contents; analysis.

Section 122. Statements to be filed with Director of Agricultural Experiment Station; to be accompanied by sample.

Section 123. License fee.

Section 124. Analysis to be made by Director of Experiment Station; samples to be taken for analysis.

Section 125. Penalty for violation of article.

Section 126. Sale of adulterated meal or ground grains; penalty.

Section 127. Violation to be reported to the Commissioner of Agriculture.

120. *Term "concentrated commercial feeding stuffs" defined:* The term "concentrated commercial feeding stuffs," as used in this article shall include linseed meals, cotton-seed meals, pea meals, cocoa-

nut meals, gluten meals, gluten feeds, maize feeds, starch feeds, sugar feeds, dried brewers' grains, malt sprouts, hominy feeds, cerealine feeds, rice meals, oat feeds, corn and oat chops, ground beef or fish scraps, mixed feeds, and all other material of similar nature; but shall not include hays and straws, the whole seeds nor the unmixed meals made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat and broom corn. Neither shall it include wheat, rye and buckwheat brans or middlings, not mixed with other substances, but sold separately, as distinct articles of commerce, nor pure grains ground together.

121. *Statements to be attached to packages; contents; analysis:* Every manufacturer, company or person who shall sell, offer or expose for sale or for distribution in this State any concentrated commercial feeding stuff, used for feeding farm live stock, shall furnish with each car or other amount shipped in bulk and shall affix to every package of such feeding stuff in a conspicuous place on the outside thereof, a plainly printed statement clearly and truly certifying the number of net pounds in the package sold or offered for sale, the name or trade mark under which the article is sold, the name of the manufacturer or shipper, the place of manufacture, the place of business and a chemical analysis stating the percentages it contains of crude protein, allowing one per centum of nitrogen to equal six and one-fourth per centum of protein, and of crude fat, both constituents to be determined by the methods prescribed by the Director of the New York Agricultural Experiment Station. Whenever any feeding stuff is sold at retail in bulk or in packages belonging to the purchaser, the agent or dealer, upon request of the purchaser, shall furnish to him the certified statement named in this section.

122. *Statements to be filed with Director of Agricultural Experiment Station; to be accompanied by sample.* Before any manufacturer, company or person shall sell, offer or expose for sale in this State any concentrated commercial feeding stuffs, he or they shall for each and every feeding stuff bearing a distinguishing name or trade mark, file annually during the month of December with the Director of the New York Agricultural Experiment Station a certified copy of the statement specified in the preceding section, said certified copy to be accompanied, when the Director shall so request, by a sealed glass jar or bottle containing at least one pound of the feeding stuff to be sold or offered for sale, and the company or person furnishing said sample shall thereupon make affidavit that said sample corresponds within reasonable limits to the feeding stuff which it represents, in the percentage of protein and fat which it contains.

123. *License fee.* Each manufacturer, importer, agent or seller of any concentrated commercial feeding stuffs shall pay annually during the month of December to the treasurer of the New York Agricultural Experiment Station a license fee of twenty-five dollars. Whenever a manufacturer, importer, agent or seller of concentrated commercial feeding stuffs desires at any time to sell such material and has not paid the license fee therefor in the preceding month of December, as required by this section, he shall pay the license fee prescribed herein before making any such sale. The amounts of license fees received by such treasurer pursuant to the provisions of this section shall be paid by him to the treasurer of the State of New York. The treasurer of the State of New York shall pay from such amount when duly appropriated the moneys required for the expense incurred in making such inspection required by this section and enforcing the provisions thereof. The Board of Control of the New York Agricultural Experiment Station shall report annually to the Legislature the amount received pursuant to this article, and the expense incurred for salaries, laboratory expenses, chemical supplies, traveling expenses, printing and other necessary matters. Whenever the manufacturer, importer or shipper of concentrated commercial feeding stuffs shall have filed the statement required by section one hundred and twenty-one of this article and paid the license fee as prescribed in this section, no agent or seller of such manufacturer, importer or shipper shall be required to file such statement or pay such fee.

124. *Analysis to be made by Director of Experiment Station; samples to be taken for analysis.* The Director of the New York Experiment Station shall annually analyze, or cause to be analyzed, at least one sample to be taken in the manner hereinafter prescribed, of every concentrated commercial feeding stuff sold or offered for sale under the provisions of this act. Said Director shall cause a sample to be taken, not exceeding two pounds in weight, for said analysis, from any lot or package of such commercial feeding stuff which may be in the possession of any manufacturer, importer, agent or dealer in this State; but said samples shall be drawn in the presence of the parties in interest, or their representatives and taken from a parcel or a number of packages, which shall not be less than ten per centum of the whole lot sampled, and shall be thoroughly mixed, and then divided into equal samples, and placed in glass vessels, and carefully sealed and a label placed on each, stating the name of the party from whose stock the sample was drawn and the time and place of drawing, and said label shall also be signed by the person taking the sample, and by the party or parties in interest or their representatives at the drawing and sealing of said samples; one of said duplicate sam-

ples shall be retained by the Director and the other by the party whose stock was sampled; and the sample or samples retained by the Director shall be for comparison with the certified statement named in section one hundred and twenty-two of this article. The result of the analyses of the sample or samples so procured, together with such additional information as circumstances advise, shall be published in reports or bulletins from time to time.

125. *Penalty for violation of article.* Any manufacturer, importer, or person who shall sell, offer or expose for sale or for distribution in this State any concentrated commercial feeding stuff, without complying with the requirements of this article, or any feeding stuff which contains substantially a smaller percentage of constituents than are certified to be contained, shall, on conviction in a court of competent jurisdiction, be fined not more than one hundred dollars for the first offense, and not more than two hundred dollars for each subsequent offense.

126. *Adulterated meal or ground grain; penalty.* Any person who shall adulterate any kind of meal or ground grain with milling or manufacturing offals, or any other substance whatever, for the purpose of sale, unless the true composition, mixture or adulteration thereof is plainly marked or indicated upon the package containing the same or in which it is offered for sale; or any person who knowingly sells, or offers for sale any meal or ground grain which has been so adulterated unless the true composition, mixture or adulteration is plainly marked or indicated upon the package containing the same, or in which it is offered for sale, shall be fined not less than twenty-five or more than one hundred dollars for each offense.

127. *Violation to be reported to the Commissioner of Agriculture.* Whenever the Director becomes cognizant of the violation of any of the provisions of this article, he shall report such violation to the Commissioner of Agriculture, and said Commissioner of Agriculture shall prosecute the party or parties thus reported; but it shall be the duty of said Commissioner upon thus ascertaining any violation of this article, to forthwith notify the manufacturer, importer or dealer in writing and give him not less than thirty days thereafter in which to comply with the requirements of this article; but there shall be no prosecution in relation to the quality of any concentrated commercial feeding stuff if the same shall be found substantially equivalent to the certified statement named in section one hundred and twenty-two of this article.

Section 2. This act shall take effect December first, eighteen hundred and ninety-nine.

Pennsylvania.

AN ACT

Regulating the sale of concentrated commercial feeding stuffs, defining concentrated feeding stuffs, prohibiting their adulteration, providing for the collection of samples, the expenses of the enforcement of the law, and fixing penalties for its violation.

Section 1. Be it enacted, &c., That every lot or parcel of any concentrated commercial feeding stuff, as defined in section two of this act, used for feeding domestic animals, sold, offered or exposed for sale within this State, shall have affixed thereto, in a conspicuous place on the outside thereof, a legible and plainly printed statement clearly and truly certifying the number of net pounds of feeding stuff contained therein; the name, brand or trade mark under which the article is sold; the name and address of the manufacturer or importer, and a statement of the percentage it contains of crude fat and of crude protein, both constituents to be determined by the methods adopted at the time by the Association of Official Agricultural Chemists of the United States. Whenever any concentrated commercial feeding stuff is sold at retail, in bulk, or in sacks belonging to the purchaser, the agent or dealer, upon request of the purchaser, shall furnish to him the certified statement named in this section.

Statement certifying weight of material, the name or trade mark, etc.

When statement is to be furnished the purchaser.

Section 2. The term "concentrated commercial feeding stuffs," as used in this act, shall include linseed meals, cotton seed meals, gluten meals, maize feeds, starch feeds, sugar feeds, dried brewers' grains, malt sprouts, hominy foods, cerealine feeds, rice meals, ground beef or fish scraps, and all other materials of similar nature, but shall not include hays and straws, the grinding together of pure whole grains, nor the unmixed meals made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat or broom corn; neither shall it include wheat, rye or buckwheat bran, or middlings not mixed with other substances, and sold separately as distinct articles of commerce.

"Concentrated commercial feeding stuffs" defined.

Section 3. No foreign mineral substance, nor substance injurious to the health of domestic animals, shall be mixed with any feeding stuff sold, or offered, or exposed for sale in this State.

Injurious substances shall not be used.

Filing of certified statement.

Section 4. Each and every manufacturer, importer, agent or seller of any concentrated feeding stuff shall, upon request, file in the office of the Secretary of Agriculture a certified copy of the statement named in section one of this act.

Penalty for omission of statement.

Proviso.

Powers and duties of Secretary of Agriculture and his agents.

The taking and labeling of samples.

Retention of samples.

Section 5. Each and every manufacturer, importer, agent or person selling, offering or exposing for sale in this State any concentrated commercial feeding stuff, as defined in section two of this act, without the statement required by section one of this act; or affixing a statement or guarantee which is false in any particular, or in relation to which the provisions of all of the foregoing sections have not been fully complied with, shall, for every such offense, forfeit and pay the sum of one hundred dollars, which shall be recoverable with costs, including the expenses of analysis, by any person suing in the name of the Commonwealth, as debts of like amount are by law recoverable: Provided, That the Secretary of Agriculture shall, together with his deputies, agents and assistants, be charged with the enforcement of this act, and shall have full access to all places of business, mills, buildings, carriages, cars, vessels and packages, of whatsoever kind, used in the manufacture, importation or sale of any concentrated commercial feeding stuff; and shall also have power and authority to open any package containing or supposed to contain any concentrated commercial feeding stuff, and take therefrom samples for anaysis, upon tendering the value of said sample; and whenever requested, said samples shall be taken in the presence of the party or parties interested or their representative, shall be thoroughly mixed and then divided into two samples and put in glass vessels and carefully sealed and a label placed upon each vessel stating the name or brand of the feeding stuff or material sampled, the name of the manufacturer when possible, the name of the party from whose stock the sample was taken, and the time and the place of taking, said labels to be signed by the Secretary of Agriculture or his agent, and by the party or parties interested or their representative, if present, at the taking of the samples. One of said duplicate samples shall be retained by the Secretary of Agriculture or his agent, and the other by the party whose stock was sampled.

Section 6. All necessary expenses under the provisions of this act shall, after approval in writing by the Governor and the Secretary of Agriculture, be paid by the State Treasurer upon the warrant of the Auditor General, in the same manner now provided by law: Provided, That not more than five thousand dollars shall be expended in any one year, and all penalties and costs for the violation of the provisions of this act shall be paid to the said Secretary of Agriculture or his agent, and by him immediately covered into the State Treasury, to be kept as a separate fund, for the use of the Department in carrying out the provisions of this act, and to be drawn out upon warrants signed by the Secretary of Agriculture and the Auditor General.

Payment of necessary expenses.

Proviso.

Application of penalties and costs.

Section 7. Every person who violates any of the provisions of this act shall also be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than fifty dollars nor more than one hundred dollars, or by imprisonment in the county jail for not less than ten nor more than thirty days, or both fine and imprisonment for the first offense, and a fine of one hundred dollars and imprisonment for every subsequent offense: Provided, That all fines and costs, including the expenses of analysis, imposed and recovered under this section shall be covered into the State Treasury, as provided by section six of this act.

Violation of act a misdemeanor.

Fine and penalty

Proviso.

Section 8. Magistrates and justices of the peace throughout this Commonwealth shall have jurisdiction to hear and determine actions arising from violation of the provisions of this act, and to hold for court or impose the penalties prescribed therein, subject to appeal as the law shall direct.

Jurisdiction of magistrates.

Section 9. This act shall take effect on the first day of October, one thousand nine hundred and one.

Act to take effect

Section 10. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

Repeal.

Approved—The 25th day of April, A. D. 1901.

WILLIAM A. STONE.

Rhode Island.

An act to regulate the sale of concentrated commercial feeding stuffs.

It is enacted by the General Assembly as follows:

Section 1. Every lot or parcel of any concentrated commercial feeding stuff, as defined in section 3 of this act, used for feeding domestic animals, sold, offered, or exposed for sale, in this State, shall have affixed thereto, in a conspicuous place on the outside thereof, a legible and plainly printed statement, stating and truly certifying the number of net pounds of feeding stuffs contained therein, the name, brand, or trade mark under which the article is sold, the name and address of the manufacturer or importer, and a statement of the percentage it contains of crude protein, allowing one per cent. of nitrogen to equal six and one-fourth per cent. of protein, and of crude fat, both constituents to be determined by the methods adopted at the time by the Association of Official Agricultural Chemists of the United States.

Section 2. The term concentrated commercial feeding stuff, as herein used, shall not include hays and straws, the whole seeds, nor the unmixed meals made directly from the seed of wheat, rye barley, oats, Indian corn, buckwheat or broom corn; nor shall it include wheat, rye and buckwheat brans or middlings unmixed with other substances and sold separately as distinct articles of commerce.

Section 3. The term concentrated commercial feeding stuffs, as herein used, shall include linseed meals, cotton seed meals, pea meals, cocoanut meals, gluten meals, gluten feeds, maize feeds, starch feeds, sugar feeds, dried brewers' grains, malt sprouts, hominy feeds, cerealine feeds, rice meals, oat feeds, corn and oat chop, corn and oat feeds, ground beef or fish scraps, mixed feeds, provenders, and all materials of a similar nature not included within section 2 of this act.

Section 4. Each and every manufacturer, importer, agent, or seller of any concentrated commercial feeding stuff, shall, upon request, file with the Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts, a certified copy of the statement named in section 1 of this act.

Section 5. Each and every manufacturer, importer, agent, or person selling, offering, or exposing for sale in this State any concentrated commercial feeding stuff, as defined in section 3 of this act, without the statement required by section 1 of this act, stating that said feeding stuff contains substantially a larger percentage of either of the constituents mentioned in section 1 than is contained therein, or in relation to which the provisions of all the foregoing sections have not been fully complied with, shall be fined not exceeding one hundred dollars for the first offense, and not exceeding two hundred dollars for each subsequent offense.

Section 6. The Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts is hereby authorized to have collected by the chemist of the Agricultural Experiment Station, or by a deputy or deputies of said chemist, a sample, not exceeding two pounds in weight, for analysis, from any lot, parcel, or package of concentrated commercial feeding stuff as defined by section 3 of this act, or unmixed meals, brans, or middlings named in section 2 of this act, which may be in the possession of any manufacturer, importer, agent or dealer, but said sample shall be taken in the presence of such party or parties in interest, or their representatives, and taken from a number of parcels or packages which shall not be less than five per cent. of the whole lot inspected, and shall be thoroughly mixed, divided into two samples, placed in glass vessels, carefully sealed, and a label placed on each stating the name or brand of the feeding stuff or material sampled, the name of the party from whose stock the sample was taken, and the time and place of taking the same; and said label shall be signed by said chemist, or his deputy, and by the party or parties in interest, or their representatives, present at the taking or sealing of said sample; one of said samples shall be retained by said chemist, or his deputy, and the other by the party whose stock was sampled. Said Board of Managers shall cause at least one sample of each brand of feeding stuff collected, as herein provided, to be analyzed annually by or under the direction of said chemist. Said analysis shall include determinations of crude fat and crude protein and such other determinations as may be at any time deemed advisable. Said Board of Managers shall cause the analyses so made to be published in Station bulletins, together with such additional information in relation to the character, composition, and use thereof as may seem to be of importance and issue the same annually, or more frequently if deemed advisable.

Section 7. It shall be the duty of the Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts to prosecute every person violating the provisions of this act, and for this purpose said Board of Managers may employ experts, if necessary, and may designate some one of their own number, or some person connected with said College, to make complaints in its behalf, and, in making complaints for violations thereof, such person so designated shall not be required to enter into any recognizance or give surety for the payment of costs.

Section 8. The term importer, for all the purposes of this act, is intended to apply to such person or persons as shall bring into and offer for sale, within this State, concentrated commercial feeding stuffs manufactured without the State.

Section 9. The sum of thirteen hundred dollars, or so much thereof as may be necessary, is hereby appropriated, annually, out of any money in the treasury not otherwise appropriated, for the purpose of defraying the expenses of collection, analysis, distribution of bulletins, correspondence, laboratory fittings, chemicals, and such other expenses as are incident to and properly arise from the execution of the provisions of this act; and the State Auditor shall draw his order upon the general treasurer for said sum, or so much thereof as may be necessary, on the presentation of vouchers properly authenticated by the Board of Managers of the Rhode Island College of Agriculture and Mechanic Arts, and approved by the Governor.

Section 10. This act shall take effect on and after July 1st, 1899.

Vermont.

An act to regulate the sale of concentrated commercial feeding stuffs.

It is hereby enacted by the General Assembly of the State of Vermont:

Section 1. Every lot or parcel of any concentrated commercial feeding stuff, as defined in section three of this act, used for feeding farm live stock, sold, offered or exposed for sale in the State of Vermont, shall, in addition to the tax tag described in section five of this act, have affixed thereunto, in a conspicuous place on the outside thereof, a plainly printed statement clearly and truly certifying the number of net pounds of feeding stuff in a package, the name, brand or trade mark under which the article is sold, the name and address of the manufacturer or importer, the place of manufacture, and a chemical analysis stating the percentages it contains, of crude protein, allowing one per cent. of nitrogen to equal six and one-fourth per cent. of protein, and of crude fat, both constituents to be determined by the methods adopted at the time by the Association of Official Agricultural Chemists: Provided, That the statement of the percentage of crude fat may be omitted if it does not exceed three per cent.

Section 2. The term concentrated commercial feeding stuff, as here used, shall not include hays and straws, the whole seed nor the unmixed meals made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat and broom corn. Neither shall it include wheat, rye and buckwheat brans or middlings, nor pure grains ground together, nor wheat bran or middlings mixed together or with other feed.

Section 3. The term concentrated commercial feeding stuff, as here used, shall include linseed meals, cotton-seed meals, pea meals, cocoanut meals, gluten meals, gluten feeds, maize feeds, starch feeds, sugar feeds, dried brewers' grains, malt sprouts, hominy feeds, cerealine feeds, rice meals, oat feeds, corn and oat chops, corn and oat feeds, ground beef or fish, mixed feeds, provenders, and all other materials of a similar nature not included within section two of this act.

Section 4. Before any concentrated commercial feeding stuff, as defined in section three of this act, is sold, offered or exposed for sale, the importer, manufacturer or party who causes it to be sold or offers it for sale within the State of Vermont, shall, for each and every feeding stuff bearing a distinguishing name and trade mark, file with the Director of the Vermont Agricultural Experiment Station a certified copy of the statement named in section one of this act, and shall also deposit with said Director, at his request, a sealed glass jar or bottle containing not less than one pound of the feeding stuff to be sold or offered for sale, accompanied by an affidavit that it is a fair average sample thereof and corresponds within reasonable limits to the feeding stuff which it represents in the percentage of protein and fat which it contains.

Section 5. The manufacturer, importer, agent or seller of each concentrated commercial feeding stuff as defined in section three of this act, shall, before the article is offered for sale, pay to the Director of the Vermont Agricultural Experiment Station an inspection tax of ten cents per ton for each ton of such concentrated feeding stuff sold or offered for sale in the State of Vermont, and shall affix to each car shipped in bulk and to each bag, barrel or other package of such concentrated feeding stuff, a tag to be furnished by said Director, stating that all charges specified in this section have been paid. The Director of said Experiment Station is hereby empowered to prescribe the forms for such tags, and adopt such regulations as may be necessary for the enforcement of the law. Whenever the manufacturer or importer or shipper of a concentrated feeding stuff shall have filed the statement made in section one of this act and paid the inspection tax, no agent or seller of said manufacturer, importer or shipper shall be required to file such statement or pay such tax. The amount of inspection tax received by said Director shall be paid by him to the State Treasurer. So much of the inspection tax collected under this act shall be paid by the State Treasurer to the treasurer of said Experiment Station as the Director of said Experiment Station may show by his bills has been expended in performing the duties required by this act, but in no case to exceed the amount of the inspection tax received by the State Treasurer under this act, such payment to be made quarterly upon the order of the Auditor of Accounts, who is hereby directed to draw his order for such purpose.

Section 6. Any manufacturer, importer, agent or person selling, offering or exposing for sale any concentrated commercial feeding stuff, as defined in section three of this act, without the statement required by section one and the tax tag required by section five of this act, or with a label stating that said feeding stuff contains substantially a larger percentage of either of the constituents mentioned in section one than is contained therein, shall on conviction in a court of competent jurisdiction be fined not more than fifty dollars for the first offense, and not more than one hundred dollars for each subsequent offense.

Section 7. All manufacturers and importers of concentrated commercial feeding stuffs, or dealers in the same, shall, when requested, furnish the Director of the Vermont Agricultural Experiment Station with a complete list of the names or trade marks of said feeding stuffs, and all agents selling, offering or exposing the same for sale.

Section 8. The Director of the Vermont Agricultural Experiment Station shall cause one analysis or more to be made annually of each concentrated commercial feeding stuff sold or offered for sale under the provisions of this act. Said Director is hereby authorized in person or by deputy to take a sample not exceeding two pounds in weight for analysis from any lot or package of concentrated commercial feeding stuff which may be in the possession of any manufacturer, importer, agent or dealer in this State; but said sample shall be drawn in the presence of said party or parties in interest, or their representative, and shall be taken from a parcel or number of packages which shall not be less than five per cent. of the whole lot inspected, and shall be thoroughly mixed and divided into two equal samples and placed in glass or metal vessels, carefully sealed and a label placed on each stating the name or brand of the feeding stuff or material sampled, the name of the party from whose stock the sample was drawn, and the time and place of drawing, and said label shall be signed by the Director or his deputy and the parties or party in interest, or their representative, present at the drawing and sealing of said sample; one of said duplicate samples shall be retained by the Director and the other by the party whose stock was sampled, and the sample or samples retained by the Director shall be for comparison with the certified statements named in sections one and four of this act. The result of the analysis of the sample or samples so procured, together with such additional information as circumstances advise shall be published in reports or bulletins from time to time.

Section 9. The Director of the Vermont Agricultural Experiment Station shall notify the State Treasurer of all violations of this act, and the State Treasurer shall commence a suit in the name of the State against the party or parties thus reported. It shall be the duty of the Treasurer upon ascertaining any violation of this act to forthwith notify the manufacturers and importers, in writing, and to give them not less than thirty days thereafter in which to comply with the requirements of this act. But there shall be no prosecution in relation to the quality of any concentrated feeding stuff if the same shall be found to be substantially equivalent to the statement of analysis made by the manufacturers or importers.

Section 10. The term importer, for all the purposes of this act, shall be taken to mean all who procure or sell concentrated commercial feeding stuffs.

Section 11. All acts or parts of acts inconsistent with this act are hereby repealed.

Section 12. This act shall take effect July 1st, 1899.

Approved November 29, 1898.

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COMMONWEALTH OF PENNSYLVANIA.

DEPARTMENT OF AGRICULTURE.

BULLETIN No. 82.

Containing the Law Creating a Department of Agriculture in
Pennsylvania, and giving the various Acts of Assembly
Committed to the Department for Enforcement;
Together with Decisions and Standards
Adopted with Reference to the
Pure Food Act of 1895.

PUBLISHED BY DIRECTION OF THE SECRETARY.

1901.

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PREFACE.

Harrisburg, Pa., September 1, 1901.

The following Bulletin, No. 82, containing the law creating the Department of Agriculture of this State, and giving the acts of Assembly committed to it for enforcement, is published for the convenience and information of the general public and of all manufacturers and dealers in the various articles whose manufacture and sale are regulated by these laws. There are also appended copies of decisions by the Supreme and Superior Courts, in respect to the color clause in the oleomargarine law, together with the opinions of the Attorney General in regard to coffee and cheese.

There has been added an Appendix, giving the decisions and rulings of the Department under the Pure Food Act of the 26th of June, 1895, with an abstract of the statutory requirements of the several laws committed to the Department for enforcement, and a list of definitions and standards for various food substances.

All of the laws in this Bulletin, excepting two, one relating to lard, and the other providing for the appointment of a Dairy and Food Commissioner, have been enacted within the last six years, or since the establishment of the Department. The scope and importance of the Department, therefore, can be partly judged from the character of the legislation which it is called upon to enforce, most of which has been prepared by the officers of the Department, for the protection of the public against injurious and fraudulent goods.

All good citizens are not only under obligations to obey the laws herein enacted, but are under obligations also to assist the officers of the Department to the extent of their ability in their enforcement. Without the co-operation of the better class of our people, no law, however valuable, can be enforced, but with their assistance, fraud can soon be broken up, and foods injurious to the public health or deceptive in their character, can be driven from the markets of the State.

This co-operation and assistance is earnestly requested, and information which will enable the officers and agents of the Department to discover offenders, and aid in suppressing illegal traffic in foods, and prevent transgression of the laws protecting the public health, is desired.

JOHN HAMILTON,
Secretary of Agriculture.

ACT CREATING A DEPARTMENT OF AGRICULTURE.

AN ACT

To establish a Department of Agriculture and to define its duties and to provide for its proper administration.

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That there be and hereby is established a Department of Agriculture, to be organized and administered by an officer who shall be known as the Secretary of Agriculture, who shall be appointed by the Governor, by and with the advice and consent of the Senate, for a term of four years, at an annual salary of three thousand five hundred dollars, and who, before entering upon the duties of his office, shall take and subscribe the oath prescribed in Article seven of the Constitution. Said secretary shall be ex-officio secretary of the State Board of Agriculture, and shall succeed to all the powers and duties now conferred by law upon the secretary of said Board.

Section 2. That it shall be the duty of the Secretary of Agriculture in such ways as he may deem fit and proper, to encourage and promote the development of agriculture, horticulture, forestry and kindred industries; to collect and publish statistics and other information in regard to the agricultural industries and interests of the State; to investigate the adaptability of grains, fruits, grasses and other crops to the soil and climate of the State, together with the diseases to which they are severally liable and the remedies therefor; to obtain and distribute information on all matters relating to the raising and care of stock and poultry; the best methods of producing wool and preparing the same for market, and shall diligently prosecute all such similar inquiries as may be required by the agricultural interests of the State and as will best promote the ends for which the Department of Agriculture is established. He shall give special attention to such questions relating to the valuation and taxation of farm land, to the variation and diversification in the kinds of crops and methods of cultivation, and their adaptability to changing markets as may arise from time to time, in consequence of a change of methods, means and rates of transportation, or in the habits or occupation of the people of the State and elsewhere, and shall publish as frequent as practicable, such information thereon as he shall deem useful. In the performance of the duties prescribed by this act, the Secretary of Agriculture shall, as far as practicable, make use of the facilities provided by the State Agricultural Experiment Station, the State Board of Agriculture and the various State and county societies and organizations maintained by agriculturists and horticulturists, whether with or without the aid of the State, and shall, as far as practicable, enlist the aid of the State Geological Survey for the purpose of obtaining and publishing useful information respecting the economic relations of geology to agriculture, forestry and kindred industries. He shall make an annual report to the Governor, and shall publish from time to time such bulletins of information as he may deem useful and advisable. Said report and bulletins shall be printed by the State Printer in the same manner as other public documents, not exceeding five thousand copies of any one bulletin.

Section 3. That it shall be the duty of the Secretary to obtain and publish information respecting the extent and condition of forest lands in this State, to make and carry out rules and regulations for the enforcement of all laws designed to protect forests from fires and from all illegal depredations and destruction, and report the same annually to the Governor, and as far as practicable, to give information and advice respecting the best methods of preserving wood lands and starting new plantations. He shall also, as far as practicable, procure statistics of the amount of timber cut during each year, the purpose for which it is used, and the amount of timber land thus cleared as compared with the amount of land newly brought under timber cultivation, and shall, in general, adopt all such measures as in his judgment may be desirable and effective for the preservation and increase of the timber lands of this State, and shall have direct charge and control of the management of all forest lands belonging to the Commonwealth, subject to the provisions of law relative thereto. The said Secretary shall also be and hereby is charged with the administration of all laws designed to prevent fraud or adulteration in the preparation, manufacture or sale of articles of food, the inspection, sale or transportation of the agricultural products or imitations thereof, and all laws relating to diseases of domestic animals, and to the manufacture and inspection of commercial fertilizers.

Section 4. There shall be one Deputy Secretary, who shall be appointed by the Governor for the term of four years, at a salary of three thousand dollars a year, who shall also be Director of Farmers' Institutes. The other officers of the Department shall be appointed by the Governor for the term of four years, and shall be an Economic Zoologist, a Commissioner of Forestry,* a Dairy and

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*The office of Commissioner of Forestry was taken out of the Department of Agriculture by act of 1901, establishing a Department of Forestry.

Food Commissioner who shall have practical experience in the manufacture of dairy products, and State Veterinarian who shall be a graduate of some reputable veterinary college, who shall receive an annual salary of twenty-five hundred dollars each. The Dairy and Food Commissioner shall, under the direction of the Secretary, perform the duties prescribed by an act approved May twenty-sixth, one thousand eight hundred and ninety-three. The Governor is hereby authorized to appoint one chief clerk of the Department at an annual salary of sixteen hundred dollars, one stenographer at a salary of eight hundred dollars a year, and one messenger at a salary of six hundred dollars a year, and the Dairy and Food Commissioner, the Commissioner of Forestry and the Economic Zoologist shall each have a clerk, who shall be appointed by the Governor, and who shall serve under the direction of the respective commissioners aforesaid, and receive a salary of fifteen hundred dollars a year each.

Section 5. That it shall be the duty of the Superintendent of Institutes to arrange them in such manner as to time and places of holding the same, as to secure the greatest economy and efficiency of service; and to this end he shall in each county where such institutes are to be held, confer and advise with the local member of the State Board of Agriculture, together with representatives duly appointed by each county agricultural, horticultural and other like organization with reference to the appointment of speakers and other local arrangements.

Section 6. That the Secretary may at his discretion employ experts for special examinations or investigations, the expenses of which shall be paid by the State Treasurer in the same manner as like expenses are provided by law, but not more than five thousand dollars shall be so expended in any one year. In his annual report to the Governor, he may include so much of the reports of other organizations as he shall deem proper, which shall take the place of the present agricultural reports, and of which thirty-one thousand six hundred copies shall be published and distributed as follows: To the Senate, nine thousand copies; to the House of Representatives, twenty thousand copies; to the Secretary of Agriculture, two thousand copies; to the State Librarian, for distribution among public libraries and for reserve work, five hundred copies, and to the State Agricultural Experiment Station, one hundred copies.

Section 7. That the Secretary of Agriculture shall have an office at the State Capitol, and it is hereby made the duty of the Commissioners of Public Buildings and Grounds to provide the necessary rooms, furniture and apparatus for the use of the Department.

Section 8. That all acts or parts of acts inconsistent herewith be and the same are hereby repealed.

Approved—March 13, 1895.

ACT PROVIDING FOR DAIRY AND FOOD COMMISSIONER.

AN ACT

To enlarge the powers of the State Board of Agriculture, to authorize the said Board to enforce the provisions of the act, entitled "An act for the protection of the public health, and to prevent adulteration of dairy products and fraud in the sale thereof," approved May twenty-one, Anno Domini one thousand eight hundred and eighty-five, and of other acts in relation to dairy products; to authorize the appointment of an agent of the said Board who shall be known as the "Dairy and Food Commissioner," and to define his duties and fix his compensation, being supplementary to an act, entitled "An act to establish a State Board of Agriculture," approved May eighth, Anno Domini one thousand eight hundred and seventy-six.

Section 1. Be it enacted, &c., That the State Board of Agriculture be and is hereby empowered and charged with the enforcement of the provisions of the act, entitled "An act for the protection of the public health, and to prevent the adulteration of dairy products and fraud in the sale thereof," approved May twenty-one, Anno Domini one thousand eight hundred and eighty-five, and with laws now enacted, or hereafter to be enacted, prohibiting or regulating the adulteration or imitation of butter, cheese or other dairy products.

Section 2. That for the purpose of securing the enforcement of the provisions of the said laws concerning dairy products, the president of the State Board of Agriculture be and hereby is authorized and empowered to appoint an agent of the said Board, who shall be known by the name and title of the "Dairy and Food Commissioner," who shall hold his office for the term of two years, or until his successor shall be duly appointed and qualified, and shall receive a salary of two thousand dollars per annum and his necessary expenses incurred in the discharge of his official duties under this act. The said agent shall be charged under the direction of the said Board with the execution and enforcement of all laws now enacted, or hereafter to be enacted, in relation to the adulteration or imitation of dairy products.

Section 3. That the said agent of the said Board, the said Dairy and Food Commissioner, is hereby authorized and empowered, subject to the approval of the said State Board of Agriculture, to appoint and fix the compensation of such assistants, agents, experts, chemists, detectives and counsel as may be deemed by him necessary for the proper discharge of the duties of his office, and for the discovery and prosecution of violations of the said laws: Provided, That the entire expenses of the said agent and of all his assistants, agents, experts, chemists, detectives and counsel (salaries included), shall not exceed the sum appropriated for the purposes of this act.

Section 4. That the said agent of the State Board of Agriculture and such assistants, agents, experts, chemists, detectives and counsel, as he shall duly authorize for the purpose, shall have full access, egress and ingress to all places of business, factories, farms, buildings, carriages, cars, vessels and cans, used in the manufacture, transportation and sale of any dairy products, or of any adulteration or imitation thereof. They shall also have power and authority to open any package, can or vessel containing dairy products, or any adulteration or imitation thereof, which may be manufactured, sold or exposed for sale, in violation of any of the provisions of any act now enacted or which may be hereafter enacted in relation to dairy products, or the adulteration or imitation thereof, and they shall also have power to take from such package, can or vessel, samples for analysis.

Section 5. That all penalties and costs received by the said State Board of Agriculture for violations of the said act of May twenty-one, Anno Domini one thousand eight hundred and eighty-five, and of other acts now enacted or hereafter to be enacted, prohibiting or regulating the adulteration or imitation of butter, cheese or other dairy products, shall be appropriated by the said Board to the payment only of the necessary expenses incurred by the said Dairy and Food Commissioner and his assistants and agents in the investigation, discovery and prosecution of violations of the said act.

Section 6. That all charges, accounts and expenses of the said Commissioner, and of all the assistants, agents, experts, chemists, detectives and counsel employed by him, shall be paid by the Treasurer of the State in the same manner as other accounts and expenses of the said State Board of Agriculture are now paid as provided by law.

Section 7. That the said Commissioner shall make annual reports of his work and proceedings, and shall report in detail the number and names of the assistants, agents, experts, chemists, detectives and counsel employed by him, with their expenses and disbursements, the number of prosecutions, the number of convictions and the penalties recovered in each case, which report shall be presented to the said State Board of Agriculture at its annual meeting.

Approved—The 26th day of May, A. D. 1893.

DAIRY PRODUCTS IN PENAL AND CHARITABLE INSTITUTIONS.

AN ACT

To prohibit the use of any adulteration or imitation of dairy products in any charitable or penal institution, being supplementary to an act, entitled "An act for the protection of the public health and to prevent adulteration of dairy products and fraud in the sale thereof," approved May twenty-one, Anno Domini one thousand eight hundred and eighty-five.

Section 1. Be it enacted, &c., That it shall not be lawful for any charitable or penal institution in the State of Pennsylvania to use or furnish to its inmates, any substance, the manufacture or sale of which is prohibited by section one of the act, entitled "An act for the protection of the public health and to prevent the adulteration of dairy products and fraud in the sale thereof," approved May twenty-first, Anno Domini one thousand eight hundred and eighty-five.

Section 2. That any officer, agent, steward or other official of any such charitable or penal institution, who shall knowingly buy any substance, the manufacture or sale of which is prohibited by section one of the said act of May twenty-one, Anno Domini one thousand eight hundred and eighty-five, for use in such charitable or penal institution, or who shall knowingly cause such substance to be used by the inmates of such charitable or penal institution, shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine not exceeding one thousand dollars, or imprisonment not exceeding two years for each offense, or either or both, at the discretion of the court.

Section 3. Every person who shall knowingly sell or offer for sale, to any officer, agent, steward or other official of any charitable or penal institution any substance, the manufacture or sale of which is prohibited by section one of the said act of May twenty-first, Anno Domini one thousand eight hundred and eighty-five, for use in such charitable or penal institution, shall be deemed guilty of a misdemeanor, and upon conviction, shall be punished by a fine not exceeding one thousand dollars or by imprisonment not exceeding two years, or either or both, at the discretion of the court.

Approved—The 23d day of May, A. D. 1893.

PURE FOOD LAW.

AN ACT

To provide against the adulteration of food, and providing for the enforcement thereof.

Section 1. Be it enacted, &c., That no person shall, within this State, manufacture for sale, offer for sale or sell any article of food which is adulterated within the meaning of this act.

Section 2. The term "food," as used herein, shall include all articles used for food or drink by man, whether simple, mixed or compound.

Section 3. An article shall be deemed to be adulterated within the meaning of this act,

(a) In the case of food: (1) If any substance or substances have been mixed with it so as to lower or depreciate or injuriously affect its quality, strength or purity. (2) If any inferior or cheaper substance or substances have been substituted wholly or in part for it. (3) If any valuable or necessary constituent or ingredient has been wholly or in part abstracted from it. (4) If it is an imitation of or is sold under the name of another article. (5) If it consists wholly or in part of a diseased, decomposed, putrid, infected, tainted or rotten animal or vegetable substance or article, whether manufactured or not—or in case of milk, if it is the product of a diseased animal. (6) If it is colored, coated, polished or powdered, whereby damage or inferiority is concealed, or if by any means it is made to appear better or of greater value than it really is. (7) If it contains any added substance or ingredient which is poisonous or injurious to health: Provided, That the provisions of this act shall not apply to mixtures or compounds recognized as ordinary articles or ingredients or articles of food, if each and every package sold or offered for sale be distinctly labeled as mixtures or compounds, and are not injurious to health.

Section 4. Every person manufacturing, offering or exposing for sale or delivering to a purchaser any article of food included in the provisions of this act, shall furnish to any person interested or demanding the same, who shall apply to him for the purpose and shall tender him the value of the same, a sample sufficient for the analysis of any such article of food which is in his possession.

Section 5. Whoever refuses to comply, upon demand, with the requirement of section four, and whoever violates any of the provisions of this act, shall be guilty of a misdemeanor, and upon conviction, shall be fined not exceeding one hundred nor less than fifty dollars, or imprisoned not exceeding ninety or less than thirty days, or both, and any person found guilty of manufacturing, offering for sale or selling any adulterated article of food under the provisions of this act, shall be adjudged to pay, in addition to the penalties herein provided for, all the necessary costs and expenses incurred in inspecting and analyzing such adulterated articles of which said person may have been found guilty of manufacturing, selling, or offering for sale: Provided, That all penalties and costs for the violation of the provisions of this act shall be paid to the Dairy and Food Commissioner, or his agent, and by him paid into the State Treasury, to be kept as a fund separate and apart for the use of the Department of Agriculture for the enforcement of this act, and to be drawn out upon warrant signed by the Secretary of Agriculture and the Auditor General.

Section 6. The agent of the Department of Agriculture, known as the Dairy and Food Commissioner, shall be charged with the enforcement of all the provisions of this act, and shall have the same power to enforce the provisions of this act that is given him to enforce the provisions of the act by which he receives his appointment.

Approved—June 26, 1895.

COMPOUND LARD.

AN ACT

To prevent fraud in the sale of lard and providing penalties for the violation thereof.

Section 1. Be it enacted, &c., That no manufacturer or other person shall sell, deliver, prepare, put up, expose or offer for sale any lard or any article intended for use as lard, which contains any ingredient but the pure fat of swine, in any tierce, tub, bucket, pail or other vessel or wrapper or under any label bearing the words "pure," "refined," "family," or either of them alone, or in combination with other words, nor unless every vessel, wrapper or label in or under which the article is sold or delivered or prepared, put up or exposed for sale, bears on the top or outside thereof, in letters not less than one-half inch in length and plainly exposed to view, the words, "COMPOUND LARD."

Section 2. Any person who violates any provision of this act shall be punished by a fine not exceeding fifty dollars for the first or one hundred dollars for any subsequent offense.

Section 3. This act shall take effect on the first day of October, one thousand eight hundred and ninety-one.

Approved—June 8, 1891.

STATE LIVE STOCK SANITARY BOARD.

AN ACT

To establish the State Live Stock Sanitary Board of Pennsylvaia, and to provide for the control and suppression of dangerous, contagious or infectious diseases of domestic animals.

Section 1. Be it enacted, &c., That a board is hereby established to be known as "The State Live Stock Sanitary Board." This board shall consist of the Governor of the Commonwealth, the Secretary of Agriculture, the State Dairy and Food Commissioner and the State Veterinarian, who shall be a competent and qualified person as provided in the act, entitled "An act to create a Department of Agriculture and to define its duties."

Section 2. That it shall be the duty of the State Live Stock Sanitary Board to protect the health of the domestic animals of the State, to determine and employ the most efficient and practical means for the prevention, suppression, control or eradication of dangerous, contagious or infectious diseases among the domestic animals, and for these purposes it is hereby authorized and empowered to establish, maintain, enforce and regulate such quarantine and other measures relating to the movements and care of animals and their products, the disinfection of suspected localities and articles and the destruction of animals, as it may deem necessary, and to adopt from time to time all such regulations as may be necessary and proper for carrying out the purposes of this act: Provided, however, In the case of any slowly contagious diseases, only suspected or diseased animals shall be quarantined.

Section 3. That when it shall be deemed necessary to condemn and kill any animal or animals to prevent the further spread of disease, and an agreement cannot be made with the owners for the value thereof, three appraisers shall be appointed, one by the owner, one by the commission or its authorized agent, and the third by the two so appointed, who shall, under oath or affirmation, appraise the animal or animals, taking into consideration their actual value and condition at the time of appraisement, and such appraised price shall be paid in the same manner as other expenses under this act are provided for: Provided, That under such appraisement not more than twenty-five dollars shall be paid for any infected animal of grade and common stock, and not more than fifty dollars for any infected animal of registered stock, nor more than forty dollars for any horse or mule of common or grade stock and not to exceed fifty per cent. of the appraised value of any standard bred, registered or imported horses.

Section 4. That the board or any member thereof, or any of their duly authorized agents, shall at all times have the right to enter any premises, farms, fields, pens, abbatoirs, slaughter houses, buildings, cars or vessels where any domestic animal is at the time quartered or wherever the carcass of one may be, for the purpose of examining it in any way that may be deemed necessary to determine whether they are or were the subjects of any contagious or infectious diseases.

Section 5. That any person or persons wilfully violating any of the provisions of this act or any regulation of the State Live Stock Sanitary Board, or wilfully interfering with officers appointed under this act, shall be deemed guilty of a misdemeanor and shall upon conviction, be punished by a fine not exceeding one hundred dollars, or by imprisonment not exceeding one month, or both at the discretion of the court.

Section 6. That the State Live Stock Sanitary Board is hereby empowered to appoint and employ such assistants and agents and to purchase such supplies and materials as may be necessary in carrying out the provisions of this act, and the board and the members thereof are hereby empowered to administer oaths and affirmations to the appraisers appointed under this act, that they may order and conduct such examinations into the condition of the live stock of the State in relation to contagious diseases, including the milk supply of cities, towns, boroughs and villages, as may seem necessary, and to take proper measures to protect such milk supplies from contamination.

Section 7. That all necessary expenses under the provisions of this act shall, after approval in writing by the Governor and the Secretary of Agriculture, be paid by the State Treasurer upon the warrant of the Auditor General in the manner now provided by law.

Section 8. That this act shall take effect June first, one thousand eight hundred and ninety-five, and all acts or parts of acts inconsistent herewith are hereby repealed.

Approved—May 21st, 1895.

EVAPORATED APPLES AND APPLE PRODUCTS.

AN ACT

To enlarge the duties of the State Food Commissioner, authorizing him to enforce all laws against the adulterations or impurities in vinegar, jellies, cider, evaporated apples and all apple products, and the unlawful labeling in the State of Pennsylvania.

Section 1. Be it enacted, &c., That the State Dairy and Food Commissioner shall be charged with the enforcement of all laws against fraud and adulteration or impurities in vinegar, jellies, cider, evaporated apples, and all apple products, and the unlawful labeling of the same in the State of Pennsylvania.

Section 2. It shall be the duty of said Dairy and Food Commissioner to inspect any article of vinegar, jellies, cider, evaporated apples or other apple products, made or offered for sale in the State of Pennsylvania as an article of food or drink, and to prosecute or cause to be prosecuted any person or persons, firm or firms, corporation or corporations, engaged in the manufacture or sale of any adulterated article of food or drink, or adulterated in violation of or contrary to any laws of the State of Pennsylvania now in force, or hereafter to be passed.

Section 3. That the said Food Commissioner and such assistants, agents, experts, chemists, detectives and counsel as he shall duly authorize for the purpose, shall have full access, egress, ingress to all places of business, factories, mills, buildings, carriages, cars, vessels and barrels, tanks and packages, of whatever kind, used in the manufacture and transportation and sale of any apple products, or of any adulteration or imitation thereof. They shall also have power and authority to open any package, barrel or vessel containing apple products, or any adulteration or imitation thereof, which may be manufactured, sold or exposed for sale in violation of any of the provisions of any act now enacted or which may be hereafter enacted, in relation to apple products, or the adulteration or imitation or unlawful labeling thereof; and they shall also have power to take from such packages, barrel or vessel, samples for an analysis, after tendering compensation for said samples thus taken.

Section 4. That all penalties and costs shall be received by the State Board of Agriculture for the violation of this act, and of other acts now enacted, or hereafter to be enacted, prohibiting or regulating the adulteration or imitation of any apple product, and shall be appropriated by the said Board to the payment only of the necessary expenses incurred by the said Dairy and Food Commissioner and his assistants and agents in the investigation, discovery and prosecution of violations of this act.

Section 5. That all charges, accounts and expenses of the said Commissioner and all of the assistants, agents, experts, chemists, detectives and counsel employed by him in carrying out the provisions of this act shall be paid by the Treasurer of the State in the same manner as the other accounts and expenses of the said Board of Agriculture are now paid, as provided by law.

Section 6. That the said Commissioner shall make an annual report of his work and proceedings, and shall report in detail, the number and names of his assistants, agents, experts, chemists, detectives and counsel employed by him in carrying out the provisions of this act, together with their expenses and disbursements, and be a part of his general report, not a separate one, to the said State Board of Agriculture, at its annual meeting.

Approved—July 5, 1895.

CATTLE QUARANTINE LAW.

AN ACT

To protect the health of the domestic animals of the Commonwealth of Pennsylvania.

Section 1. Be it enacted, &c., That the importation of dairy cows and neat cattle for breeding purposes into the Commonwealth of Pennsylvania is hereby prohibited, excepting when such cows and neat cattle are accompanied by a certificate from an inspector, whose competency and reliability are certified to by the authorities charged with the control of the diseases of domestic animals in the State from whence the cattle came, certifying that they have been examined and subjected to the tuberculin test and are free from disease.

Section 2. That in lieu of an inspection certificate as above required, the cattle may be detained at suitable stock-yards nearest to the State line on the railroad over which they are shipped, and there examined at the expense of the owner, or cattle as above specified from points outside of the State may, under such restrictions as may be provided by the State Live Stock Sanitary Board, be shipped in quarantine to their destination in Pennsylvania, there to remain in quarantine until properly examined at the expense of the owner, and released by the State Live Stock Sanitary Board.

Section 3. The State Live Stock Sanitary Board is hereby authorized and empowered to prohibit the importation of domestic animals into the Commonwealth of Pennsylvania, whenever in their judgment such measures may be necessary for the proper protection of the health of the domestic animals of the Commonwealth, and to make and enforce rules and regulations governing such traffic as may from time to time be required.

Section 4. That any person, firm, or corporate body violating the provisions of this act, shall be deemed guilty of a misdemeanor, and upon conviction shall, in the proper court of the county in which such cattle are sold, offered for sale, delivered to a purchaser, or in which such cattle may be detained in transit, for each offense, forfeit and pay a fine of not less than fifty dollars or more than one hundred dollars, or be punished by imprisonment for not less than ten days, and not exceeding thirty days, either or both, at the discretion of court. Such person, firm or corporate body shall be liable for the full amount of the damages that may result from the violation of this act.

Section 5. The State Live Stock Sanitary Board is hereby charged with the enforcement of this act and is authorized to see that its provisions are obeyed, and to make, from time to time, such rules and regulations as may be necessary and proper for its enforcement.

Section 6. That this act shall go into effect January first, one thousand eight hundred and ninety-eight.

Approved—May 26, 1897.

ADULTERATION OR COLORING OF MILK OR CREAM.

AN ACT

To prohibit the adulteration or coloring of milk and cream by the addition of so-called preservatives or coloring matter, and to provide for the enforcement of the same.

Section 1. Be it enacted, &c., That if any person, firm or corporate body, by himself, herself or themselves, or by his, her or their agents or servants, shall offer for sale, expose for sale, sell, or have in possession with intent to sell, for human consumption, milk or cream to which has been added boracic acid salt, boracic acid, salicylic acid, salicylate of soda, formaline, formaldehyde, sodium fluoride, sodium benzoate, or any other compound or substance for the purpose of preserving or coloring the same, shall be deemed guilty of a misdemeanor, and upon conviction thereof in the court of quarter sessions of the proper county, shall be sentenced to pay a fine of not less than fifty nor more than one hundred dollars, or to undergo an imprisonment not exceeding sixty days, or both, at the discretion of the court. —Amendment of 19th of April, 1901.

Section 2. The agent of the Department of Agriculture, known as the Dairy and Food Commissioner, shall be charged with the enforcement of all the provisions of this act, and shall have all the power to enforce this act that is given him to enforce the provisions of the act by which he receives his appointment.

Section 3. All penalties and costs for the violation of the provisions of this act shall be paid to the Dairy and Food Commissioner or his agent, and by him into the State Treasury, to be kept as a fund, separate and apart, for the use of the Department of Agriculture for the enforcement of this act, and to be drawn out upon the warrant signed by the Secretary of Agriculture and the Auditor General.

Section 4. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

Approved—The 10th day of June, 1897.

VINEGAR LAW.

AN ACT

Providing for the regulation of the manufacture and sale of distilled and fermented vinegars, prescribing their standard, to prevent the adulteration of the same, providing for the enforcement thereof, and punishment for the violation of the same.

Section 1. Be it enacted, &c., That from and after the passage of this act no person, firm or corporate body shall manufacture for sale, offer for sale or expose for sale, sell or deliver, or have in his, her or their possession with intent to sell or deliver, any vinegar not in compliance with the provisions of this act. No vinegar shall be sold or exposed for sale as apple or cider vinegar which is not the legitimate product of pure apple juice, or vinegar not made exclusively of said apple cider, or vinegar in which foreign substances, drugs or acids shall have been introduced, as may appear upon proper test; no vinegar shall be branded fruit vinegar unless the same be made wholly from grapes, apples or other fruits.—Amendment of May 21, 1901.

Section 2. All vinegar made by fermentation and oxidation, without the intervention of distillation, shall be branded "fermented vinegar," with the name of the fruit or substance from which the same is made. And all vinegar made wholly or in part from distilled liquor shall be branded as "distilled vinegar," and all such distilled vinegar shall be free from coloring matter, added before, during or after distillation, and from color other than that imparted to it by the process of distillation, and shall contain not less than four per centum, by weight, of absolute acetic acid. And all vinegar shall be made wholly from the fruit or grain from which it is represented to be made, and shall contain no foreign substance: Provided, That this shall not be construed to prohibit the use of such an amount of spices as are necessary for flavoring, provided such spices do not color the vinegar.—Amendment of 21st May, 1901.

Section 3. No person, firm or corporate body shall manufacture for sale, offer for sale, or have in his, her or their possession with intent to sell or expose for sale, any vinegar found upon proper test to contain any preparation of lead, copper, sulphuric or other mineral acid, or other ingredients injurious to health. And all packages containing vinegar shall be plainly and distinctly marked on each head of the cask, barrel or keg containing such vinegar, or if sold in other packages, each package shall be plainly and distinctly marked with the name and residence of the manufacturer, together with the brand required in section two thereof.

Section 4. Every person, firm or corporate body who shall violate any of the provisions of this act shall, for every such offense, forfeit and pay not less than fifty dollars nor more than one hundred dollars, which shall be recoverable, with costs, including expense of inspection and analysis, by any person suing in the name of the Commonwealth as debts of like amount are by law recoverable: Provided, That the Department of Agriculture, through its officer known as the Dairy and Food Commissioner, together with the deputies, agents and assistants, shall be charged with the enforcement of this act, and shall have full access to all places of business, factories, mills, buildings, carriages, cars, vessels, barrels, tanks and packages of whatever kind used in the manufacture and transportation and sale of any vinegar, or of any adulteration or imitation thereof, or any package in which vinegar is mixed with articles of food. They shall also have power and authority to open any package, barrel or vessel containing any vinegar, or any adulteration or imitation thereof, which may be manufactured, sold or exposed for sale, and they shall also have full power and authority to take the samples therefrom for analysis upon tendering the value of said samples. And all charges, accounts and expenses of the Department for the enforcement of this act, through the said Commissioner and his deputies, agents, assistants, chemists, and counsel employed by him, in carrying out the provisions of this act, shall be paid by the Treasurer of the State in the same manner as other accounts and expenses of the said Department are paid. And all penalties and costs for the violation of the provisions of this act shall be paid to the Dairy and Food Commissioner, or his agents, and by him immediately covered into the State Treasury, to be kept as a fund for the use of the Department, and to be drawn out upon the warrant signed by the Secretary of Agriculture and the Auditor General.

Section 5. Every person who violates any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not less than fifty dollars, nor more than one hundred dollars, or by imprisonment in the county jail for not less than ten nor more than thirty days, or both fine and imprisonment for the first offense, and a fine of one hundred dollars and imprisonment for thirty days for every subsequent offense: Provided, That all fines and costs, including the expense of inspection and analysis imposed under this section, shall be covered into the State Treasury as provided by section four of this act, and all vinegar sold or offered for sale in violation of the provisions of this act shall be subject to forfeitures and spoliation.

Section 6. Magistrates and justices of the peace throughout this Commonwealth shall have jurisdiction to hear and determine actions arising for violations of the provisions of this act, and to hold for court, or impose the penalties provided therein, subject to appeal as the law shall direct.

Section 7. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

Approved—The 18th day of June, A. D. 1897.

CHEESE LAW.

AN ACT

To prevent fraud and deception in the manufacture and sale of cheese, and defining what shall constitute the various grades of cheese, providing rules and regulations for marking and branding the same, providing for the enforcement of this act, prescribing penalties for its violation.

Section 1. Be it enacted, &c., That no person, firm or corporate body shall manufacture, sell, or offer for sale or have in his or their possession with intent to sell, any cheese not the legitimate product of pure, unadulterated milk or cream, or any cheese into which any foreign fats or substances have been introduced as may appear upon proper test.

Section 2. All cheese manufactured or sold within this Commonwealth shall be divided into five grades, and shall be branded or stenciled in ordinary bold-faced capital letters, not less than one-half inch in height on one side of each cheese, and upon one side of the box or case containing the cheese, the manufacturer's name and postoffice address, and the words "FULL CREAM," "THREE-FOURTHS CREAM," "ONE-HALF CREAM," "ONE-FOURTH CREAM," and "SKIMMED CHEESE." All cheese branded "FULL CREAM" shall contain not less than thirty-two per centum of butter fat as may appear upon proper test. All cheese branded "THREE-FOURTHS CREAM" shall contain not less than twenty-four per centum of butter fat, as may appear upon proper test. All cheese branded "ONE-HALF CREAM" shall contain not less than sixteen per centum of butter fat, as may appear upon proper test. All cheese branded "ONE-FOURTH CREAM" shall contain not less than eight per centum of butter fat, as may appear upon proper test. All cheese containing less that eight per centum of butter fat, as may appear upon proper test, shall be branded "SKIMMED CHEESE:" Provided, however, That all full cream cheese sold, shipped or consigned to dealers outside of the Commonwealth of Pennsylvania may be branded, or stenciled, or not, as required by this act, at the option of the manufacturer.—Amendment of May 2, 1901.

Section 3. Every person, firm or corporation who shall violate any of the provisions of this act shall, for every such offense, forfeit and pay the sum of not less than fifty dollars, nor more than one hundred dollars, together with all charges and expenses for inspection and analysis connected therewith, by any person suing therefor in the name of the Commonwealth, as debts of like amount are by law recoverable; and justices of the peace and aldermen throughout this Commonwealth shall have jurisdiction to hear and determine all actions arising under the provisions of this act, and all cheese not in accordance with this act shall be subject to forfeiture and spoliation: Provided, That the Department of Agriculture, through its officer, known as the Dairy and Food Commissioner, together with his deputies, agents and assistants, shall be charged with the enforcement of the provisions of this act, and shall have authority to enter any building or factory where the same is sold or manufactured or exposed for sale, and shall have the right to take samples sufficient for analysis, upon tendering the value thereof. All fines and penalties, including also all charges for inspection and analysis, shall be paid to the Dairy and Food Commissioner, his deputies, agents or assistants, and by him immediately covered into the State Treasury, and so much of said fund as may be necessary for the enforcement of this act shall be drawn out upon warrants signed by the Secretary of Agriculture and Auditor General: Provided, That the provisions of this act shall not be construed to apply to such cheese as is known as "fancy" cheese and is under five pounds in weight, each; or to what is known as cottage cheese or pot cheese, and do not contain anything injurious to health.

Section 4. This act shall take effect sixty days after its approval by the Governor of the Commonwealth.

Approved—The 23d day of June, A. D. 1897.

CONTAGIOUS DISEASES AMONG FRUIT TREES.

AN ACT

To prevent the spread of the contagious diseases known as yellows, black knot, peach rosette and pear blight among orchard and nursery trees, or the fruit thereof, also the infection known as the San Jose Scale, when found on any vine, plant, shrub, orchard or nursery tree, and providing measures for the eradication of the same.

Section 1. Be it enacted, &c., That it shall be unlawful for any person to keep any orchard or nursery tree or trees infected with the contagious diseases known as yellows, black knot, peach rosette, or pear blight; or any vine, plant, shrub, orchard or nursery tree or trees, infected with the San Jose Scale; or to offer for sale or shipment, or to sell or to ship, any of the fruit thereof, except the fruit of the plum, cherry and pear tree, that both tree and fruit so infected shall be subject to destruction as public nuisances, as hereinafter provided. No damage shall be awarded in any court in the State for entering upon the premises and destroying such diseased trees or parts of trees, or fruit, if done in accordance with the provisions of this act. It shall be the duty of every person as soon as he becomes aware of the existence of such diseases in any tree, parts of trees, or fruit, owned by him, to forthwith destroy or cause said trees or fruit to be destroyed: Provided however, That it shall be sufficient to extinguish the San Jose Scale with effective insecticides.

Section 2. In any township, borough or city of this State in which such contagious diseases exist, or in which there is good reason to believe they exist, or danger may be justly apprehended of their introduction, it shall be the duty of the board or township auditors, or borough or city council, as soon as such information becomes known to either such board or council, or any member thereof, to appoint forthwith three competent freeholders, of such township, borough or city, as commissioners, who shall hold office during the pleasure of said board, borough or city council, and such order of appointment and of revocation shall be entered at large upon the township, borough or city records: Provided, That in case commissioners have already been appointed to prevent the spreading of bush, vine and fruit-tree pests, such commissioners shall be ex-officio commissioners under this act, and shall continue in said office until their successors are appointed and qualified.

Section 3. It shall be the duty of said commissioners, within ten days after their appointment as aforesaid, to file their acceptances of the same with the clerk of said township, borough or city, and said clerk shall be ex-officio clerk of said board of commissioners and he shall keep a correct record of the proceedings of said board in a book to be provided for the purpose, and shall file and preserve all papers pertaining to the duties and actions of said commissioners, or either of them, which shall be a part of the records of said borough, township or city: Provided, That if there is no township clerk, then it shall be the duty of the township auditors to select one of their number as such clerk.

Section 4. It shall be the duty of the commissioners or any one of them, upon or without complaint, whenever it comes to their notice that either of the diseases known as yellows, black knot, peach rosette, pear blight, or San Jose Scale exist or are supposed to exist within the limits of their township, borough or city, to proceed without delay to examine the tree or fruit supposed to be infected, and if the disease is found to exist, a distinguishing mark shall be placed upon the diseased trees, and the owner notified, personally or by a written notice left at his usual place of residence, or, if the owner be a non-resident, by leaving the notice with the person in charge of the trees or fruit, or the person in whose possession said trees or fruit may be. The notice shall contain a simple statement of the facts as found to exist, with an order to treat with insecticides, or to effectually uproot and destroy by fire the trees so marked or designated, or such parts thereof as the commissioners shall order, within five days, Sundays excepted, from the date of the service of the notice; and in case of fruit infected, such notice shall require the person in whose possession or control it is found to immediately destroy the same or cause it to be done, or the commissioners may destroy the same. Said notice and order to be signed by two or more of the commissioners.

Section 5. Whenever any person shall refuse or neglect to comply with the order to remove and destroy the trees, or parts of trees, so designated and marked by the commissioner or commissioners, as aforesaid, it shall become the duty of the commissioner or commissioners to cause said trees, or parts of trees, to be removed and destroyed forthwith, employing all necessary aid for that purpose. The expenses for such removal and destruction of trees, or parts of trees, to be made a charge against the township, borough or city; and for the purpose of such a removal or destruction the said commissioners, their agents and workmen, shall have the right and power to enter upon any and all premises within their township, borough or city: Provided, however, That any owner or owners, lessee or lessees, who may be dissatisfied with the decision of the commissioner or commissioners, on the ground that their tree or trees are not diseased, nor attacked by the San Jose Scale, may appeal in writing, stating their grievance in full to the clerk of the board of commissioners, who shall immediately refer the case to the Department of Agriculture of Pennsylvania. And the Secretary of the said Department of Agriculture, upon receiving such reference, shall detail an inspector, who shall be an expert in the line of complaint, whose duty it shall be to forthwith proceed to view the trees, or parts of trees, in controversy, and whose decision shall be final. All actual expenses, in the case of an appeal being made, shall be paid by the township, borough or city, in the same manner as hereinafter provided for, for the service of the commissioners.

Section 6. If any owner neglect to uproot and destroy or cause to be removed and destroyed, as aforesaid, such diseased trees, or parts of trees, or fruit, after such examination and notification and within the time hereinbefore specified, or any other person who shall sell or offer for sale such diseased fruit, such persons shall be deemed guilty of a misdemeanor, and punished by a fine not exceeding one hundred dollars, in the discretion of the court; and any justice of the peace of the township or borough, or any alderman of any city, where such trees may be, or where such nursery stock or fruit is sold, shipped, disposed of or delivered, as aforesaid, shall have jurisdiction thereof. The words "parts of trees," whenever used in this act shall refer to black knot and pear blight only, and not to trees affected with yellows.

Section 7. The commissioners shall be allowed for services under this act two dollars for each full day and one dollar for each half day, and their other charges and disbursements under this act, by the township board, borough or city council, all of which costs, charges, expenses and disbursements may be recovered by the township, borough or city from the owner of such diseased fruit, vine, plant, shrub, orchard trees or nursery stock, or from the owner of the premises on which said diseased trees stood, in action of assumpsit: Provided, Said owner has refused or neglected to remove said diseased fruit, vine, plant, shrub, fruit-tree or nursery stock in compliance with the order of said commissioner or commissioners.

Section 8. All acts inconsistent with this act are hereby repealed. This act is ordered to take immediate effect.

Approved—The 28th day of April, A. D. 1899.

COMMERCIAL FERTILIZER LAW.

AN ACT

To regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation.

Section 1. Be it enacted, &c., That every package of commercial fertilizer sold, offered, or exposed for sale, for manurial purposes, within this Commonwealth, shall have plainly stamped thereon the name of the manufacturer, the place of manufacture, the net weight of its contents, and an analysis stating the percentage therein contained of nitrogen in an available form of potash, soluble in water, of soluble and reverted phosphoric acid and of insoluble phosphoric acid: Provided, That any commercial fertilizer sold, offered, or exposed for sale, which shall contain none of the above named constituents shall be exempt from the provisions of this act.

Section 2. That every manufacturer or importer of commercial fertilizers as specified in section one of this act shall, on or before the first day of January next ensuing, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture an affidavit showing the amount of said fertilizer sold within the Commonwealth during the last preceding year; and if the said amount shall be one hundred tons or less, he shall pay to the Treasurer of the State the sum of fifteen dollars for each and every brand of such commercial fertilizer sold within the State during the last preceding year; and if the said amount shall exceed one hundred tons, and be less than five hundred tons, he or they shall pay the sum of twenty dollars, as aforesaid; and if the said amount shall be five hundred tons or more, he or they shall pay the sum of thirty dollars, as aforesaid. If such manufacturer or manufacturers, importer or importers, shall not have made any sales within the Commonwealth during the preceding year, he or they shall pay the sum of fifteen dollars, as aforesaid. Every said manufacturer shall, at the same time, file with the Secretary of Agriculture a copy of the analysis required by section one of this act, and shall then be entitled to receive from the Secretary of Agriculture a certificate showing that the provisions of this act have been complied with.

Section 3. The Secretary of Agriculture is hereby empowered to colect samples of commercial fertilizers, either in person or by his duly qualified agent or representative, and to have them analyzed, and to publish the results for the information of the public.

Section 4. The Secretary of Agriculture, and such assistants, agents, experts, chemists, detectives and counsel as he shall duly authorize for the purpose, shall have full access, ingress and egress to all places of business, factories, farms, buildings, carriages, cars and vessels, used in the manufacture, transportation or sale of any commercial fertilizer. They shall also have power to open any package or vessel containing or supposed to contain any commercial fertilizer, and to take therefrom samples for analysis upon tendering the value of said samples.

Section 5. Any person selling, offering, or exposing for sale, any commercial fertilizer, without the analysis required by section one of this act, or with an analysis stating that it contains a larger percentage of any one or more of the above named constituents than is contained therein, or for the sale of which all the provisions of section two have not been complied with, shall be guilty of misdemeanor, and on conviction shall forfeit a sum not less than twenty-five and not exceeding one hundred dollars for the first offense, and not less than two hundred dollars for each subsequent offense. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act, and all penalties, costs and fines recovered shall be paid to him or his duly authorized agent, and by him be immediately paid into the State Treasury, to constitute a special fund to be used in accordance with the provisions of section six of this act.

Section 6. The money paid into the Treasury under the provisions of this act shall constitute a special fund, from which the cost of selecting samples, making analyses, and other expenses incident to the carrying into effect the provisions of this act, shall be paid: Provided, That the total amount thus expended shall in no case exceed the amount paid into the Treasury.

Section 7. The term "commercial fertilizers," as used in this act, shall be taken to mean any and every substance imported, manufactured, prepared or sold for fertilizing or manuring purposes, except barnyard manure, marl, lime, and wood ashes, and not exempt by the provisions of section one of this act.

Section 8. This act shall go into effect on and after the thirty-first day of December, one thousand nine hundred and one. All acts or parts of acts inconsistent with this act are hereby repealed, except that existing laws are to continue in force until this act goes into effect.

Approved—The 25th day of March, A. D. 1901.

LINSEED OIL LAW.

AN ACT

To prevent the adulteration of, and deception in the sale of, linseed or flaxseed oil.

Section 1. Be it enacted, &c., That no person, firm or corporation shall manufacture or mix for sale, sell or offer for sale, under the name of raw linseed oil, any article which is not wholly the product of commercially pure linseed or flaxseed. Nor shall any person, firm or corporation manufacture or mix for sale, sell or offer for sale, under the name of boiled linseed oil, any article unless the oil from which said article is made, be wholly the product of commercially pure linseed or flaxseed, and unless the same has been heated to at least two hundred and twenty-five degrees, Fahrenheit.

Section 2. Nothing in this act shall be construed as prohibiting the sale or manufacture of any compound of linseed or flaxseed oil: Provided, That such compound, if it imitates in appearance and is designed to take the place of linseed or flaxseed oil, shall not be manufactured or mixed for sale, sold or offered for sale, under the name or description containing the words "linseed oil" or "flaxseed oil."

Section 3. Any person, firm or corporation who shall violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished for each and every such violation with a fine of not less than fifty dollars nor more than five hundred dollars, and, in default of the payment of such fine, shall be committed to the county jail for a period of not less than thirty days.

Section 4. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act. The said Secretary and his assistants, experts and chemists, and others appointed by him, shall have access, ingress and egress to and from all places of business and buildings where linseed or flaxseed oil is kept for sale or stored. They shall also have the power and authority to open any tank, barrel, can or other vessel containing such oil, and may inspect the contents thereof and take samples therefrom for analysis.

Section 5. Any person, firm or corporation who shall violate any of the provisions of this act shall, in addition to the fines herein previously described for each offense, forfeit and pay a fixed penalty of one hundred dollars. Such penalty shall be recovered, with costs, in any court of the State having jurisdiction thereof, in an action to be prosecuted in the name of the people by the Secretary of Agriculture or by any of his assistants, and shall be devoted to the payment of the expenses of the Department of said Secretary. In any action commenced for the recovery of such penalties, an application may be made on the part of the plaintiff to a court of competent jurisdiction, or any judge thereof, for an injunction to restrain the defendant, his agents, servants and employes, from the further violation of this act during the pendency of the action; and it shall be the duty of such court, or judge, to grant the injunction, in the same manner as injunctions are usually granted under the rules and practice of such court, upon proof by affidavits that the defendant has been guilty of such violation either before or after the commencement of the action. In case the plaintiff shall recover judgment for the penalty or penalties demanded in the complaint, the judgment shall contain a permanent injunction restraining the defendant, his agents, servants and employes, from any further violation of the section or sections on which the recovery is obtained.

Approved—The 23d day of April, A. D. 1901.

CONCENTRATED COMMERCIAL FEEDING STUFFS.

AN ACT

Regulating the sale of concentrated commercial feeding stuffs, defining concentrated feeding stuffs, prohibiting their adulteration, providing for the collection of samples, the expenses of the enforcement of the law, and fixing penalties for its violation.

Section 1. Be it enacted, &c., That every lot or parcel of any concentrated commercial feeding stuff, as defined in section two of this act, used for feeding domestic animals, sold, offered or exposed for sale within this State, shall have affixed thereto, in a conspicuous place on the outside thereof, a legible and plainly printed statement clearly and truly certifying the number of net pounds of feeding stuff contained therein; the name, brand or trade mark under which the article is sold; the name and address of the manufacturer or importer, and a statement of the percentage it contains of crude fat and of crude protein, both constituents to be determined by the methods adopted at the time by the Association of Official Agricultural Chemists of the United States. Whenever any concentrated commercial feeding stuff is sold at retail, in bulk, or in sacks belonging to the purchaser, the agent or dealer, upon request of the purchaser, shall furnish to him the certified statement named in this section.

Section 2. The term "concentrated commercial feeding stuffs" as used in this act, shall include linseed meals, cotton seed meals, gluten meals, maize feeds, starch feeds, sugar feeds, dried brewers' grains, malt sprouts, hominy foods, cerealine feeds, rice meals, ground beef or fish scraps, and all other materials of similar nature, but shall not include hays and straws, the grinding together of pure whole grains, nor the unmixed meals made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat, or broom corn; neither shall it include wheat, rye or buckwheat bran, or middlings not mixed with other substances, and sold separately as distinct articles of commerce.

Section 3. No foreign mineral substance, nor substance injurious to the health of domestic animals, shall be mixed with any feeding stuff sold, or offered, or exposed for sale in this State.

Section 4. Each and every manufacturer, importer, agent or seller of any concentrated feeding stuff shall, upon request, file in the office of the Secretary of Agriculture a certified copy of the statement named in section one of this act.

Section 5. Each and every manufacturer, importer, agent or person, selling, offering or exposing for sale in this State any concentrated commercial feeding stuff, as defined in section two of this act, without the statement required by section one of this act; or affixing a statement or guarantee which is false in any particular, or in relation to which the provisions of all of the foregoing sections have not been fully complied with, shall, for every such offense, forfeit and pay the sum of one hundred dollars, which shall be recoverable with costs, including the expenses of analysis, by any person suing in the name of the Commonwealth, as debts of like amount are by law recoverable: Provided, That the Secretary of Agriculture shall, together with his deputies, agents and assistants, be charged with the enforcement of this act, and shall have full access to all places of business, mills, buildings, carriages, cars, vessels and packages, of whatsoever kind, used in the manufacture, importation or sale of any concentrated commercial feeding stuff; and shall also have power and authority to open any package containing or supposed to contain any concentrated commercial feeding stuff, and take therefrom samples for analysis, upon tendering the value of said sample; and whenever requested, said samples shall be taken in the presence of the party or parties interested or their representative, shall be thoroughly mixed and then divided into two samples and put in glass vessels and carefully sealed, and a label placed upon each vessel stating the name or brand of the feeding stuff or material sampled, the name of the manufacturer when possible, the name of the party from whose stock the sample was taken, and the time and the place of taking, said labels to be signed by the Secretary of Agriculture or his agent, and by the party or parties interested or their representative, if present, at the taking of the samples. One of said duplicate samples shall be retained by the Secretary of Agriculture or his agent, and the other by the party whose stock was sampled.

Section 6. All necessary expenses under the provisions of this act shall, after approval in writing by the Governor and the Secretary of Agriculture, be paid by the State Treasurer upon the warrant of the Auditor General, in the manner now provided by law: Provided, That not more than five thousand dollars shall be expended in any one year, and all penalties and costs for the violation of the provisions of this act shall be paid to the said Secretary of Agriculture or his agent, and by him immediately covered into the State Treasury, to be kept as a separate fund, for the use of the Department in carrying out the provisions of this act, and to be drawn out upon warrants signed by the Secretary of Agriculture and the Auditor General.

Section 7. Every person who violates any of the provisions of this act shall also be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not less than fifty dollars nor more than one hundred dollars, or by imprisonment in the county jail for not less than ten nor more than thirty days, or both fine and imprisonment for the first offense, and a fine of one hundred dollars and imprisonment for every subsequent offense: Provided, That all fines and costs, including the expense of analysis, imposed and recovered under this section shall be covered into the State Treasury, as provided by section six of this act.

Section 8. Magistrates and justices of the peace throughout this Commonwealth shall have jurisdiction to hear and determine actions arising from violation of the provisions of this act, and to hold for court or impose the penalties prescribed therein, subject to appeal as the law shall direct.

Section 9. This act shall take effect on the first day of October, one thousand nine hundred and one.

Section 10. All act or parts of acts inconsistent with the provisions of this act are hereby repealed.

Approved—The 25th day of April, A. D. 1901.

FRUIT JUICE LAW.

AN ACT

Relative to adulteration of natural fruit juice, and providing penalties for violations thereof.

Section 1. Be it enacted, &c., That from and after the passage of this act any person or persons, firm or corporation, who shall knowingly sell, offer or expose for sale, or give away, any compound or preparation composed in whole or in part of any unwholesome, deleterious or poisonous acid, or other unwholesome deleterious or poisonous substance, as a substitute for the pure, unadulterated and unfermented juice of lemons, limes, oranges, currants, grapes, apples, peaches, plums, pears, berries, quinces, or other natural fruits, representing such compound or preparation to be the pure, unadulterated and unfermented juice of any such fruits; or who, in the mixing, decoction of, preparation of, food or drink, shall knowingly use any such compound or preparation in the place of, or as a substitute for, the pure, unadulterated and unfermented juice of one or more of such fruits; shall be guilty of a misdemeanor, and upon conviction shall be punished by a fine of not more than two hundred and fifty dollars or by imprisonment for not more than six months, or by both such fine and imprisonment, at the discretion of the court.

The agent of the Department of Agriculture, known as the Dairy and Food Commissioner of this State, shall be charged with the enforcement of all the provisions of this act, and shall have the same power to enforce the provisions of this act that is given him to enforce the provisions of the act by which he receives his appointment.

All acts or parts of acts inconsistent herewith be and the same are hereby repealed.

Approved—The 2d day of May, A. D. 1901.

CONTAGIOUS DISEASES AMONG DOMESTIC ANIMALS.

AN ACT

To provide for the prevention of the spread of disease from the carcasses of animals that die of dangerous or virulent disease, or are killed while afflicted with such disease; to provide for the safe disposal or destruction of such carcasses; to authorize the State Live Stock Sanitary Board to make regulations for the enforcement of this act; and to provide penalties for the violations of this act and of the regulations that may be made under it by the State Live Stock Sanitary Board.

Section 1. Be it enacted, &c., That when any domestic animal may die of, or be killed while afflicted with, an infectious, contagious, germ or parasitic disease, adjudged by the State Live Stock Sanitary Board to be of a dangerous or virulent character, and in particular, when any domestic animal may die or be killed while it is afflicted with any one of the diseases known as anthrax, black quarter, hog cholera, swine plague, rabies or glanders, the owner or owners of such animal shall at once destroy or dispose of the carcass of such animal by one of the methods herein provided.

Section 2. The methods of destruction or disposal shall be of a kind that will completely destroy or securely sequester the poison, germ, parasite or infective agent of the disease with which the animal was afflicted at the time of death. The following methods of destruction or disposal shall be allowed: *One.* Complete burning or cremation of the carcass, and of all of its parts and products. *Two.* Boiling the carcass and all of its parts and products in water, or heating the same with steam, at the temperature of boiling water, for at least two hours. *Three.* Burying the carcass and all of its parts and products in a place that is not subject to overflow from ponds or streams, that is distant not less than one hundred feet from any water course, well, spring, public highway or building used as a house or stable, and in the following manner, to wit: The grave shall be of such a depth that when the carcass and the parts and products thereof are placed in it, and the grave is filled with earth and the top is smoothed to the level of the surrounding surface, the uppermost part of the carcass and of its parts and products shall be completely covered; and, further, the grave shall be so protected that the carcass cannot be dug out or exposed by dogs or other animals. Before the carcass and its parts and products are covered with earth they shall be covered with lime, to a depth of not less than three inches. Any other method of destroying or disposing of carcasses, and of the parts and products of carcass, may be practiced that is specifically approved by the State Live Stock Sanitary Board.

Section 3. If any person owning an animal that dies while it is afflicted with anthrax, black quarter, hog cholera, swine plague, rabies or glanders, or any other infectious, contagious, germ or parasitic disease, that is adjudged by the State Live Stock Sanitary Board to be of a dangerous or virulent character, shall, after notification by anyone neglect within twenty-four hours to destroy or dispose of the carcass and its parts and products in accordance with the provisions of section two of this act, the said person shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than ten dollars nor more than one hundred dollars, at the discretion of the court.

Section 4. When the carcass and products of any animal that died while afflicted with any of the diseases specified in section one of this act, or of any infectious, contagious, germ or parasitic disease, adjudged by the State Live Stock Sanitary Board to be of a dangerous or virulent character, is not disposed of or destroyed in one of the ways set forth in section two of this act, and this fact shall be brought to the attention of an agent of the State Live Stock Sanitary Board, the board of health of the township, borough or city in which the death occurs or in which the carcass of the animal may be; or when this fact shall be brought to the attention of any member of such board of health; or in the event that there is no board of health having jurisdiction, when any township auditor, of a township in which such a carcass may be, is notified of the fact; it shall be the duty of the said agent of the State Live Stock Sanitary Board, or member of a board of health, or said health board, or said township auditor, to at once cause the carcass and its parts and products to be disposed of or destroyed in accordance with the methods prescribed in section two of this act.

The disposal or destruction of the carcass shall be carried out in a way that is as economical as is compatible with efficiency and safety, and a fully itemized bill of the expense incurred shall be drawn up by the agent of the State Live Stock Sanitary Board, the board of health, or the board of township auditors, and forwarded as a voucher to the State Live Stock Sanitary Board. If the voucher is approved by said board, it shall be paid in the same manner as other expenses of said board are paid: Provided, however, That no charge shall be paid of more than ten dollars for the destruction of a single carcass of a horse, mule, cow, bull, or ox; nor more than three dollars for the destruction of a single carcass of a colt, calf, sheep, hog, or dog.

Section 5. The cost of the destruction of the carcass or carcasses, as hereinbefore provided, shall constitute a lien on the property of the owner or owners of the animals at the time of their death; and it shall be the duty of the State Live Stock Sanitary Board to attempt to recover, and if possible to recover, by due process of law, from said owner or owners the amounts expended by it for disposing of or destroying the carcasses of their animals, in the enforcement of this act.

Approved—The 2d day of May, A. D. 1901.

OLEOMARGARINE LAW.

AN ACT

To prohibit the manufacture and sale of oleomargarine, butterine, and other similar products, when colored in imitation of yellow butter; to provide for license fees to be paid by manufacturers, wholesale and retail dealers, and by proprietors of hotels, restaurants, dining-rooms and boarding houses; for the manufacture or sale of oleomargarine, butterine, or other similar products, not colored in imitation of yellow butter; and to regulate the manufacture and sale of oleomargarine, butterine, or other similar products, not colored in imitation of yellow butter, and prevent and punish fraud and deception in such manufacture and sale as an imitation butter; and to prescribe penalties and punishment for violations of this act, and the means and the method of procedure for its enforcement, and regulate certain matters of evidence in such procedure.

Section 1. Be it enacted, &c., That no person, firm or corporation shall, by himself, herself, or themselves, or by his, her or their agent or servant, nor shall any officer, agent, servant or employe of any person, firm or corporation, manufacture, sell, ship, consign, offer for sale, expose for sale, or have in possession with intent to sell, oleomargarine, butterine, or any similar substance, article, product or compound, made wholly or partly out of any fats, oils or oleaginous substance, or compound thereof, not produced from pure, unadulterated milk, or cream from the same, without the admixture or addition of any fat foreign to the said milk or cream, and which shall be in imitation of yellow butter, produced from pure, unadulterated milk, or cream of the same, with or without coloring matter, unless such person, firm or corporation shall have first obtained a license and paid a license fee, as hereinafter provided; nor unless the said article, product or compound, so manufactured, shipped, consigned, offered for sale, exposed for sale, or had in possession with intent to sell, shall be made and kept free from all coloration or ingredients causing it to look like yellow butter; nor unless the same shall be kept and presented in a separate and distinct form, and in such manner as will advise the purchaser and consumer of its real character; nor unless such person, firm or corporation shall in all other respects comply with and observe the provisions of this act.

Section 2. Every person, firm or corporation, and every agent of such person, firm or corporation, desiring to manufacture, sell or offer, or expose for sale, or have in possession with intent to sell, oleomargarine, butterine, or any similar substance, not made or colored in imitation of yellow butter, shall make application for a license so to do, in such form as shall be prescribed by the Department of Agriculture through its agent, the Dairy and Food Commissioner; which application, in addition to other matters which may be required to be stated therein by said Dairy and Food Commissioner, shall contain an accurate description of the place where the proposed business is intended to be carried on, and the name and style under which it is proposed to conduct the said business. If the said application is satisfactory to the said Dairy and Food Commissioner, and said name and style shall not, in the judgment of the Dairy and Food Commissioner, be calculated to deceive or mislead the public as to the real nature of the business so proposed to be carried on, he shall issue to the applicant or applicants a license, authorizing him, her or them to engage in the manufacture or sale of oleomargarine, or butterine, or any similar substance, which shall not contain any coloration or ingredient that causes it to resemble or be in imitation of yellow butter; for which said license the applicant or applicants shall first pay: if a manufacturer, the annual sum of one thousand dollars; if a wholesaler, the annual sum of five hundred dollars; and if a retailer, the annual sum of one hundred dollars; if a proprietor of a hotel, restaurant or dining room, the annual sum of fifty dollars; and if a proprietor of a boarding house, the annual sum of ten dollars; and the said license fee, when received by the Dairy and Food Commissioner or his agent, shall be by him immediately covered into the State Treasury. Such licenses shall not authorize the manufacture or sale, exposing for sale, or having in possession with intent to sell, oleomargarine, butterine or any similar substance, at any other place than that designated in the application and license; and the said license shall not authorize the manufacture, sale, exposing for sale, or having in possession with intent to sell, any oleomargarine, butterine or any similar substance, made or colored so as to resemble or be in imitation of yellow butter.

All licenses under this act shall expire on the thirty-first day of December of each year, but licenses may be granted to commence on the first day of any month for the remainder of a year, upon the payment of a proportionate part of the annual license fee; such licenses may be transferred by the Dairy and Food Commissioner upon the application in writing of the person, firm or corporation to which the same has been granted: Provided, That transferree shall comply with the regulations made by the said Dairy and Food Commissioner in regard to the said transfer, and shall thereafter comply with the provisions of this act.

Wholesale dealers, within the meaning of this act, shall be all persons, firms and corporations who shall sell to dealers, and persons who shall buy to sell again, and all persons, firms and corporations who make sales in quantities of ten pounds and over, at any time and retail dealers shall be all persons, firms and corporations who shall sell in quantities less than ten pounds.

Section 3. After obtaining the license required by this act, the person, firm or corporation obtaining the same shall, before beginning any business under the said license, hang up and display, in a conspicuous place, on the walls of the room or store in which the oleomargarine, butterine or other similar substance is manufactured, sold or exposed for sale, the license so obtained as aforesaid; and shall also procure from the Department of Agriculture, through the Dairy and Food Commissioner, a sign or signs, which in number, size and lettering shall be as the Dairy and Food Commissioner shall direct, and which shall be uniform throughout the Commonwealth, clearly setting forth that he, she or they are engaged in the manufacture or sale of oleomargarine; which said sign or signs, when procured, shall be hung up in a conspicuous place or places on the walls of every room or store in which the oleomargarine, butterine or other similar substance is manufactured or sold. And in addition to such sign or signs, so hung up as aforesaid, every proprietor of a hotel, restaurant, dining-room or boarding-house, shall also have conspicuously placed, upon every counter or table at which food, meals or refreshments are served to customers, a placard plainly printed, in letters not less than one-half inch in length, stating that oleomargarine is used and served to customers.

Section 4. It shall be unlawful for any person, firm or corporation, or any agent thereof, to sell or offer or expose for sale, or have in possession with intent to sell, any oleomargarine, butterine or similar substance, not in imitation of yellow butter, which is not marked and distinguished, on the outside of each tub, package or parcel thereof, in a consicuous place by a placard with the word "OLEOMARGARINE" printed thereon; such placard to be placed in a conspicuous position, in full view of the purchaser, and the said word "OLEOMARGARINE" on such placard shall be printed in plain, uncondensed, Gothic letters, not less than one inch long, and such placard shall not contain any other words thereon. And there shall also be displayed upon every open tub, package or parcel containing such oleomargarine, butterine or similar substance, not in imitation of yellow butter, in the same manner, in a conspicuous position, a placard with the word "OLEOMARGARINE" printed thereon, in the same form as above described in this section; and when oleomargarine, butterine or other similar substance, not in imitation of yellow butter, is sold from such tub or package, or otherwise, at retail in print, roll or other form, before being delivered to the purchaser it shall be wrapped in wrappers, plainly stamped on the outside thereof with the word "OLEOMARGARINE," printed or stamped thereon in letters one-fourth inch square; and said wrapper shall also contain the name and address of the seller and the quantity sold, and no other words thereon, and the said word "OLEOMARGARINE" so stamped or printed on the said wrapper, shall not be in any manner concealed, but shall be in plain view of the purchaser at the time of purchase.

Section 5. Every licensed manufacturer of oleomargarine, butterine or other similar product, not in imitation of yellow butter, and every licensed wholesale dealer therein, shall keep a book in which shall be entered accurately every sale and shipment of oleomargarine, butterine or other similar substance, not in imitation of yellow butter; giving the date of sale and shipment, the quantity, the person to whom sold and shipped, the place to which shipped, and the name of the transportation line by which shipped; which book shall always be open to the examination of the Dairy and Food Commissioner, his agents, attorneys and representatives. Every licensed retail dealer in oleomargarine, butterine or similar substance, not in imitation of yellow butter, shall keep an accurate account, in a book open to the examination of the Dairy and Food Commissioner, his agents, attorneys and representatives, in which shall be entered the date of the receipt of all purchases of oleomargarine, butterine or any similar substance, made by such retail dealer; stating therein where, when and from whom purchased, and the quantity; and the said books, so to be kept by manufacturers, wholesale and retail dealers, shall be in such form as the Dairy and Food Commissioner shall direct.

Section 6. Every person, firm or corporation, and every officer, agent, servant and employe of such person, firm or corporation, who shall manufacture, sell or offer, or expose for sale, or have in possession with intent to sell, oleomargarine, butterine or any similar substance, in violation of any of the provisions of this act; or who shall sell oleomargarine, butterine, or any similar substance, as or for butter; or who shall fail to keep a book, in accordance with the last preceding section; or who shall, in any other respect, violate any of the provisions of this act, shall, for every such offense, forfeit and pay the sum of one hundred dollars, which shall be recoverable, with the costs, including the expense of analysis, by any person suing in the name of the Commonwealth, as debts of like amount are by law recoverable; and justices of the peace and aldermen throughout this Commonwealth shall have jurisdiction to hear and determine all actions for recovery of said penalties, with the right to either party to appeal to the court of common pleas, as provided in existing laws in suits for penalties. And all penalties and costs imposed and recovered under the provisions of this act shall be paid to the Dairy and Food Commissioner, or his agents, and by him immediately covered into the State Treasury, to be paid out and used as hereinafter provided.

Section 7. In addition to the above penalty, every person, firm or corporation, and every officer, agent, servant or employe of such person, firm or corporation, who violates any of the provisions of this act shall also be guilty of a misdemeanor; and upon conviction thereof, shall be punished for the first offense by a fine of not less than one hundred dollars, nor more than five hundred dollars, or by imprisonment in the county jail for not more than three months, or both, at the discretion of the court; and upon conviction of any subsequent offense, shall be punished by a fine of not less than five hundred dollars, nor more than one thousand dollars, and by imprisonment in the county jail for not less than six months nor more than twelve months.

Section 8. In any proceeding under this act, either for the collection of a penalty or a prosecution for a misdemeanor, the certificate of the Dairy and Food Commissioner and the Secretary of Agriculture, under the seal of the Department of Agriculture, shall be accepted by justices of the peace, aldermen, and courts of record, as evidence of the granting of licenses to manufacture or sell oleomargarine or butterine, or of the fact that no such license has been granted to any particular person, firm or corporation.

Section 9. Whenever a suit for the collection of a penalty, under the provisions of this act, shall be appealed to any court of record, or whenever any prosecution for a misdemeanor on account of any violation of the provisions of this act has been returned to any court of quarter sessions, it shall be lawful for the Dairy and Food Commissioner, his agents or attorneys, in case the person or persons who have been sued for such penalty, or prosecuted for such misdemeanor, have since the commencement of such suit or prosecution again violated any of the provisions of this act, to apply to the court, having jurisdiction of such appeal or of such prosecution, or to any law judge thereof, by petition, setting forth the facts, and asking the said court to make an order commanding and restraining the person or persons, so sued or prosecuted as aforesaid, from further violating any of the provisions of this act until such time as the said suit for penalty or the said prosecution shall have been finally decided and determined; and thereupon the said court, or any law judge thereof, after such notice to such person or persons, so sued or prosecuted as aforesaid, as to the said court or judge may appear proper, and after inquiring into the facts alleged in said petition, shall, if satisfied that any violation of the provisions of this act has been committed by such person or persons since the commencement of said suit or prosecution, make an order commanding and restraining the said person or persons from any further violation of the provisions of this act until such time as the said suit or prosecution shall have been finally decided and determined; and in case, upon the final determination of said suit or prosecution, it shall appear that the said person or persons had incurred the liability to payment of the penalty for which suit had been so brought, or has been duly convicted of a misdemeanor in the prosecution so commenced as aforesaid, the said court or law judge thereof shall make the aforesaid order, restraining the said person or persons from the further violation of the provisions of this act, continuing and permanent; and any violation by any person or persons of any such restraining order of such court or judge, whether the said restraining order shall be made during the pendency of a suit for penalty or of a prosecution as above stated, of after the final determination of such suit or prosecution in the manner aforesaid, shall be punishable as a contempt of the court so making the said order; and the said court is hereby authorized to take such steps for the punishment of such contempt as may by law be now taken for disregarding any injunction or other order of the courts of common pleas of this Commonwealth, sitting in equity and exercising equity jurisdiction. No security shall be required on the part of the petitioner for such restraining order, and the costs of the application and subsequent proceedings thereon shall be in the discretion of the court.

Section 10. It shall be the duty of every constable in any city, borough, ward or township of this Commonwealth, having knowledge of any violation of this act, or whenever requested so to do by the Dairy and Food Commissioner, his agent, or attorney, or by any citizen of this Commonwealth, to make report to the court of quarter sessions of the proper county, as part of his quarterly report and return to said court, of the name of every person, firm or corporation known by him to have violated any of the provisions of this act, or alleged by the person so giving notice as aforesaid to said constable to have violated any of the provisions of this act, and of the names of all witnesses furnished to said constable, whose testimony it is alleged will sustain or prove the fact of such violation; and it shall be the duty of the judge of the said courts to make inquiry of all constables, at the time of the making of their quarterly returns to the court of quarter sessions, as to whether they have knowledge, and whether notice has been given to them, respectively, of any violation of this act, in accordance with the terms of this section; and whenever such quarterly reports shall contain the name of any person alleged to have violated the provisions of this act, together with the names of witnesses to prove such violations, as also the name of the person giving notice to the constable as aforesaid, the said court shall direct the district attorney to prepare an indictment against every person so named, and call and send the witnesses, whose names have been so returned, before the grand jury then sitting, in support of the said indictment; and if a true bill shall be returned by the grand jury, thereupon to issue a summary process to bring in the person so charged to answer the matters alleged in such prosecution, and thereupon proceed to trial as speedily as possible, according to the course of practice in the said court of quarter sessions.

Section 11. The Dairy and Food Commissioner shall be charged with the enforcement of all the provisions of this act; but any citizen of the Commonwealth, having knowledge or information of the violation of any of the provisions of this act, may, in the name of the Commonwealth, begin a suit for penalty or prosecution for misdemeanor, in accordance with the provisions of this act, and may prosecute to final judgment any such suit or prosecution, giving notice in writing, however, to the Dairy and Food Commissioner of the commencement of such suit or prosecution, immediately upon the commencement of the same, stating the nature of the proceeding and the magistrate before whom commenced; and shall, in like manner, report to the Dairy and Food Commissioner each successive step taken in such suit or prosecution; and such citizen shall, upon complying with the provisions of this section, be entitled to receive one-half of any penalty or fine which may be recovered in such proceeding and paid to the Dairy and Food Commissioner; and immediately upon the receipt and covering into the treasury of any such penalty or fine, recovered and paid in any proceeding commenced by a citizen as aforesaid, the Dairy and Food Commissioner shall pay the one-half thereof to the said citizen, so commencing said proceeding and complying with the provisions of this section. Such citizen shall also be entitled to recover from the defendant his witness fees and other legal costs as fixed by law, in said proceeding.

Section 12. The money paid into the Treasury under the provisions of this act shall constitute a special fund, for the use of the Department of Agriculture in enforcing this law; and may be drawn out upon warrants signed by the Secretary of Agriculture and approved by the Auditor General, subject, however, to the payment to any citizen commencing and successfully prosecuting a proceeding for any violation of this act, under the last preceding section, one-half of the penalty or fine so recovered in such proceeding and paid into the State Treasury.

Section 13. The Dairy and Food Commissioner, his assistants, agents, experts, chemists, detectives and counsel, duly appointed by him for the purpose, shall have full access, egress and ingress to all places of business, factories, farms, buildings, carriages, cars, vessels and cans, used in the manufacture, transportation and sale of any dairy products, or of any adulteration or imitation thereof; and shall also have power and authority to open any package, can or vessel containing, or which may be supposed to contain, oleomargarine, butterine or other similar substance, or any adulteration or imitation of butter, which may be manufactured, sold or exposed for sale in violation of any of the provisions of this act, or of any act which may be hereafter enacted in relation to butter or the adulteration or imitation thereof; and they shall also have power to take from such package, can or vessel samples for analysis, upon paying or tendering the value of such samples.

Section 14. The Dairy and Food Commissioner shall publish a semi-annual bulletin, and distribute the same in the same manner as other bulletins of the Department of Agriculture are published and distributed; which semi-annual bulletin shall contain the name and address of every person, firm or corporation to whom a license has been issued for the manufacture or sale of oleomargarine, butterine or other similar substance; and also, a tabulated statement of all the actions, civil or criminal, which have been brought for the violations of this act, giving the name and address of the defendant, and the disposition of every such case.

Section 15. All acts or parts of acts inconsistent with this act are hereby repealed; but the repeal of said acts shall not in any way interfere with, or prevent the prosecution to final termination of, any actions, civil or criminal, now pending or which may hereafter be commenced, for any violation of said acts which has already been committed.

Approved—The 29th day of May, A. D. 1901.

NURSERY INSPECTION LAW.

AN ACT

For the protection of trees, shrubs, vines and plants, known as nursery stock, against destructive insects; providing for the enforcement of this act, the expenses connected therewith, and fixing penalties for its violation.

Section 1. Be it enacted, &c., That no person shall knowingly or wilfully keep any tree, shrub, vine or plant in any nursery in this Commonwealth, nor knowingly or willingly send out from such nursery any tree, shrub, vine or plant affected with San Jose Scale or other insect destructive of such tree, vine, shrub or plant.

Section 2. It shall be the duty of the Secretary of Agriculture to cause an examination to be made, at least once each year, of each and every nursery or other place in this State where trees, shrubs, vines or plants, commonly known as nursery stock, are grown for sale, for the purpose of ascertaining whether the trees, shrubs, vines or plants, therein kept or propagated for sale, are infested with San Jose Scale or other insect pest destructive of such trees, shrubs, vines or plants. If, after such examination, it is found that the said trees, shrubs, vines or other plants, so examined, are free in all respects from any such dangerously injurious insect pest or pests, the said Secretary, or his duly authorized agent or other person designated to make such examination, shall thereupon issue to the owner or proprietor of the said stock, thus examined, a certificate setting forth the fact of the examination and that the stock so examined is apparently free from any and all such destructive insect pest or pests.

Section 3. Should any nurseryman, agent, dealer or broker send out or deliver, within the State, trees, vines, shrubs, plants, buds, or cuttings, commonly known as nursery stock, and which are subject to the attacks of the insects designated in this act, unless he has in his possesion a copy of said certificate, dated within the year thereof, or wrongfully be in possession of said certificate, he shall be guilty of a misdemeanor, and upon conviction shall be punished in accordance with the provisions of section eight of this act.

Section 4. All nursery stock, as designated in this act, sent out by any nurseryman, agent, dealer or broker within this State, shall be accompanied by a copy of said certificate attached to each box, bale or package. A certificate issued by an official of the United States, setting forth the fact that the nursery stock is free from any and all such destructive insect pest or pests, shall be accepted in lieu of State inspection. Also, empowering all transportation companies to reject all nursery stock not accompanied with a certificate of inspection.

Section 5. Whenever any trees, shrubs, plants or vines are shipped into the State from some other State, country or province, every package thereof shall be plainly labeled on the outside with the name of the consignor, the name of the consignee, and a certificate showing that the contents have been inspected by a State or government officer, and that the trees, vines, shrubs or plants therein contained appear free from all dangerously destructive insects. When nursery stock is shipped into this State, accompanied by a certificate as herein provided, it shall be held to be prima facie evidence of the facts therein stated, but the Secretary of Agriculture, by himself or his assistants, when they have reason to believe that any such stock is infested with dangerous insects, shall be authorized to inspect the same and subject it to like treatment as provided in sections six and seven of this act.

Section 6. If, after examination, it is found that any nursery stock, either in a nursery or sent forth to deliver in this State, is found to be infested with San Jose Scale or other destructive insect pest or pests, it shall be the duty of the Secretary of Agriculture, by himself or his duly authorized representative or agent, to take means to control, prevent the spread of, or secure the extermination of such insect pest or pests, and shall have power to enter upon premises and order the treatment or destruction of such dangerously injurious insect pest or pests, or the nursery stock infested therewith, giving written notice to the owner or person in charge of the premises or nursery stock so infested. Such notice shall contain a brief statement of the facts found to exist, whereby it is deemed necessary to treat or destroy said trees, shrubs, vines or plants, and shall call attention to the law under which it is proposed to treat or destroy them. In case of objection to the findings of the inspector or agent of the Secretary of Agriculture, an appeal shall be made to the said Secretary, whose decision shall be final. An appeal must be taken within six days from the service of said notice, and shall act as a stay of proceedings until it is heard and decided.

Section 7. When the Secretary of Agriculture, or the person or persons appointed by him, shall finally determine, in accordance with the provisions of this act, that any tree or trees, shrubs, vines or other plants, must be treated or destroyed, he shall notify in writing the owner or the person in charge of said infested stock or property, and shall direct him, within a time and in a manner prescribed in such notice, to treat or destroy such infested property. If the person so notified shall refuse or neglect to treat, destroy or disinfect said property, in the manner and within the time prescribed in the said notice, the Secretary shall cause such property to be so treated, and he may employ all necessary assistants for that purpose; and such person or persons, agent or agents, employe or employes, may enter any or all premises in any township, borough or city, necessary for the purpose of such treatment, removal or destruction, and he shall certify to the owner or person in charge of the premises the amount of the cost of said treatment, removal or destruction, and if not paid to him within sixty days thereafter, the same may be recovered together with the cost of action.

Section 8. Any person violating the provisions of this act or offering any hindrance to the carrying out of this act, shall be adjudged guilty of a misdemeanor, and, upon conviction before a magistrate or justice of the peace, shall be fined not less than ten dollars and not more than one hundred dollars for each and every offense, together with all the costs of the prosecution, and shall stand committed until the same is paid. All necessary expenses, under the provisions of this act, shall, after approval in writing by the Secretary of Agriculture and Auditor General, be paid by the State Treasurer upon warrant of the Auditor General, in the manner now provided by law: Provided, That not more than four thousand dollars shall be so expended for this purpose in any one year.

Section 9. All penalties and costs recovered for the violation of any of the provisions of this act shall be paid to the Secretary of Agriculture or his agent, and by him be immediately covered into the State Treasury, to be kept as a fund for the use of the Department of Agriculture in the enforcement of the law, and may be drawn out upon vouchers signed by the Secretary of Agriculture and approved by the Auditor General.

Section 10. The provisions of this act shall not apply to florists' greenhouse plants, flowers and shrubbery, known as greenhouse stock.

Section 11. This act shall take effect on the first day of August, Anno Domini one thousand nine hundred and one.

Approved—The 10th day of June, A. D. 1901.

"BOILED" OR "PROCESS" BUTTER LAW.

AN ACT

Defining boiled or process butter; designating the name by which it shall be known; providing for the licensing of manufacturers and dealers therein, and regulating the sale and labelling of the same so as to prevent fraud and deception in its sale; providing punishment for violations of this act, the methods of procedure for its enforcement, and certain matters of evidence in such procedure.

Section 1. Be it enacted, &c., That for the purposes of this act certain food product, usually known as "boiled" or "process" butter, produced by taking original packing stock and other butter and melting the same so that the butter oil can be drawn off, mixed with milk or skimmed milk or other material, and by emulsion or other process, produce butter, and butter produced by any similar process, and commonly known as "boiled" or "process" butter; and which "boiled" or "process" butter for the purpose of this act shall be known and designated as "renovated butter."

Section 2. Every person, firm or corporation, and every agent of such person, firm or corporation, who shall desire to engage in the business of manufacturing or selling "renovated butter," shall first make application to the Department of Agriculture for a license, authorizing him, her or them to engage in the manufacture or sale of "renovated butter," and such application for license shall be in such form as shall be prescribed by the Department of Agriculture through its agent, the Dairy and Food Commissioner; which application, in addition to other matters which may be required to be stated therein by the said Dairy and Food Commissioner, shall contain an accurate description of the place where the proposed business is intended to be carried on, and the name and style under which it is proposed to conduct the said business, which name and style shall not, in the judgment of the Dairy and Food Commissioner, be calculated to deceive or mislead the public as to the real nature of the business so proposed to be carried on; and if the said application is satisfactory to the said Dairy and Food Commissioner, he shall issue to the applicant or applicants a license, authorizing him, her or them to engage in the manufacture or sale of "Renovated Butter," for which said license the applicant or applicants shall first pay, annually, the following sum: if a manufacturer, the annual sum of one thousand ($1,000) dollars; if a wholesale dealer, the annual sum of five hundred ($500) dollars; if a retailer, the annual sum of one hundred ($100) dollars; if a restaurant keeper or dining room proprietor, or a hotel proprietor, the annual sum of fifty ($50) dollars; if a boarding house keeper, the annual sum of ten ($10) dollars; and the said license fees, when received by the said Dairy and Food Commissioner or his agent, shall be by him immediately paid into the State Treasury. All licenses under this act shall expire the thirty-first day of December of each year, but licenses may be granted to begin on the first of any month, for the remainder of a year, upon the payment of a proportionate part of the annual license fee. Wholesale dealers, within the meaning of this act, shall be all persons, firms or corporations who shall sell to dealers, and persons who shall buy to sell again, and all persons, firms and corporations who make sales in quantities of ten pounds and over at any time. An agent of a manufacturer located outside of the State, and taking orders within this State for such "Renovated Butter," to be delivered from the factory or from a storage-house, or from one place of business to another within this State, shall be, within the meaning of this act, a wholesale dealer. And retail dealers shall be all persons, firms or corporations who sell in quantities of less than ten pounds. Every restaurant keeper or dining room proprietor or hotel proprietor or boarding house keeper, who furnishes "Renovated Butter" as part of the meal served to customers or guests, shall be regarded as a dealer in "Renovated Butter." Such license may be transferred by the Dairy and Food Commissioner, upon the application in writing of the person, firm or corporation to which the same has been granted, provided the transferree shall comply with the provisions of this act and with the regulations made by the said Dairy and Food Commissioner in regard to said transfer. Such license shall not authorize the manufacture or sale, exposing for sale or having in possession with intent to sell, "Renovated Butter" at any place other than that designated in the application and license. The license, procured as aforesaid, shall be hung up in a conspicuous place, in the place of business, room or store where such "Renovated Butter" is authorized to be sold.

Section 3. That no person, firm or corporation shall sell or offer or expose for sale, or have in his, her or their possession with intent to sell, any "Renovated Butter" from a wagon or other vehicle, or upon the public streets or roads, or from house to house.

Section 4. Every person, firm or corporation who shall obtain a license for the manufacture or sale of "Renovated Butter" shall also be required, before engaging in such manufacturing or sale, to procure from the Dairy and Food Commissioner a sign or signs, of such form, size and lettering as the Dairy and Food Commissioner shall determine, and which shall be uniform throughout the Commonwealth; which said sign or signs shall clearly set forth that he, she or they are engaged in the manufacture or sale of "Renovated Butter," and which sign or signs when procured shall be hung up in a conspicuous place or places, on the wall of each room or store or place of business in which "Renovated Butter" is manufactured or sold; and in addition to such sign or signs, so hung up as aforesaid, every restaurant keeper or dining-room proprietor, or hotel proprietor or boarding-house keeper, shall also have conspicuously placed upon every counter or table, at which food, meals or refreshments are served to customers, a placard, plainly printed in letters not less than one-half inch in length, stating that "Renovated Butter" is used and served to customers. Every person, firm or corporation who shall obtain a license as a manufacturer or wholesale dealer, for the manufacture or sale of renovated butter, shall also be required, before engaging in such manufacture or sale, to procure from the Dairy and Food Commissioner a stencil, of such form, size and lettering as the Dairy and Food Commissioner shall determine, and which shall be uniform throughout the Commonwealth; which said stencil shall designate the number of the said license, and the name and address of the holder thereof; which said stencil shall be used by the manufacturer or wholesale dealer, and said stencil brand shall be placed on each and every package, before being sold by the manufacturer or wholesale dealer to the retailer. If an package of renovated butter shall be found in the possession of any manufacturer or wholesale dealer or retail dealer, without the said stencil brand being found thereon, such package shall be seized by the Dairy and Food Commissioner or by any of his agents, and said package shall be forfeited, and shall be sold by the Dairy and Food Commissioner or his agents, and the proceeds thereof paid to the State Treasurer, for the use of the Department of Agriculture.

Section 5. It shall be unlawful for any person, firm or corporation, or any agent thereof, to sell, or offer or expose for sale, or have in his, her or their possession with intent to sell, any "Renovated Butter," not marked and distinguished on the outside of each tub, package or parcel thereof, in a conspicuous place, by a placard with the words "Renovated Butter;" and such placard shall be printed in plain, uncondensed Gothic letters, not less than one-half inch long, and such placard shall not contain any other words, printing or device thereon; and also, upon every open tub, package or parcel, containing such "Renovated Butter," there shall be displayed in the same manner, in a conspicuous place, a placard with the words "Renovated Butter" printed thereon, in the same form as above described in this section; and when "Renovated Butter" is sold from such package, or otherwise, at retail, in print, roll or other form, before being delivered to the purchaser it shall be wrapped in wrappers, plainly stamped on the outside thereof with the words "Renovated Butter," printed or stamped thereon in letters one-quarter of an inch square, and such wrapper shall contain no other words or printing thereon; and the said words "Renovated Butter," so stamped or printed on the said wrapper, shall not be in any manner concealed, but shall be in plain view of the purchaser at time of purchase.

Section 6. Every person, firm or corporation who shall have obtained a license, and be engaged in the business of manufacturer or wholesale dealer in "Renovated Butter," shall keep a book, in which shall be entered accurately every sale and shipment, the quantity and person to whom sold and shipped, the place to which shipped and the name of the transportation line by which shipped; which said book shall be always open to the inspection of the Dairy and Food Commissioner, or his agents, attorneys and representatives. Every retail dealer in "Renovated Butter" shall keep an accurate account, in a book open to the examination of the Dairy and Food Commissioner, or his agents, attorneys and representatives, in which said book shall be entered the date of the receipt of all purchases of "Renovated Butter" made by such retail dealer, stating therein where and from whom purchased, and the quantity so purchased.

Section 7. Every person, firm or corporation, and every agent of such person, firm or corporation, who shall manufacture, sell or offer, or expose for sale, or have in his, her or their possession with intent to sell, "Renovated Butter," in violation of any of the provisions of this act, or who shall in any other respects violate any of the provisions of this act, shall for every offense forfeit and pay the sum of one hundred ($100) dollars, which shall be recoverable with the costs, including the expense of the inspection and analysis, by any person suing in the name of the Commonwealth, as debts of like amount are by law recoverable; and justices of the peace and aldermen, throughout this Commonwealth, shall have jurisdiction to hear and determine all actions for recovery of penalties for violations of the provisions of this act, with the right of appeal in either party to the court of common pleas, as provided in existing laws in suits for penalties; and all penalties and costs, imposed and recovered under the provisions of this act, shall be paid to the Dairy and Food Commissioner or his agents, and by him immediately covered into the State Treasury, to be paid out and used as hereinafter provided.

Section 8. In addition to the above penalty, every person, firm or corporation, and every agent of such person, firm or corporation, who violates any of the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction, shall be punished for the first offense by a fine of not less than one hundred ($100) dollars, nor more than three hundred ($300) dollars, or by imprisonment in the county jail for not more than thirty (30) days, or both, at the discretion of the court; and for the second offense, by a fine of not less than three hundred ($300) dollars and not exceeding five hundred ($500) dollars, and imprisonment not exceeding two (2) years.

Section 9. In any proceedings under this act, either for the collection of a penalty or prosecution for a misdemeanor, the certificate of the Dairy and Food Commissioner and the Secretary of Agriculture, under the seal of the Department of Agriculture, shall be accepted by justices of the peace, aldermen and courts of record as evidence of the granting of a license to manufacture or sell "Renovated Butter," or of the fact that no such license has been granted to any particular person, firm or corporation.

Section 10. Whenever a suit for the collection of a penalty, under the provisions of this act, shall be appealed to any court of record, or whenever any prosecution for a misdemeanor, on account of any violation of the provisions of this act, has been returned to any court of quarter sessions, it shall be lawful for the Dairy and Food Commissioner, his agents or attorneys, in case the person or persons who have been sued for such penalty or prosecuted for such misdemeanor have, since the commencement of such suit or prosecution, again violated any of the provisions of this act, to apply to the court having jurisdiction of such appeal or of such prosecution, or to any law judge thereof, by petition setting forth the facts, and asking the said court to make an order commanding and restraining the person or persons, so sued or prosucted as aforesaid, from further violating any of the provisions of this act until such time as the said suit for penalty or the said prosecution shall have been finally decided and determined; and thereupon the said court, or any law judge thereof, after such notice to such person or persons, so sued or prosecuted as aforesaid, as to the said court or judge may appear proper, and after inquiring into the facts alleged in said petition, shall, if satisfied that any violation of the provisions of this act has been committed by such person or persons since the commencement of said suit or prosecution, make an order, commanding and restraining the said person or persons from any further violations of the provisions of this act, until such time as the said suit or prosecution shall have finally decided and determined; and in case, upon the final determination of said suit or prosecution, it shall appear that the said person or persons had incurred the liability to payment of the penalty for which said suit had been so brought, or has been duly convicted of a misdemeanor in the prosecution so commenced as aforesaid, the said court or law judge thereof shall make the aforesaid order, restraining the said person or persons from the further violation of the provisions of this act, continuing and permanent; and any violation by any person or persons of any restraining order of such court or judge, whether the restraining order shall be made during the pendency of a suit for penalty, or of a prosecution as above stated, or after the final determination of such suit or prosecution in the manner aforesaid, shall be punishable as a contempt of the court so making the said order. And the said court is hereby authorized to take such steps for the punishment of such contempt as may by law be now taken for disregarding any injunction or other order of the courts of common pleas of this Commonwealth sitting in equity and exercising equity jurisdiction. No security shall be required on the part of the petitioner for such restraining order, and the costs of the application and subsequent proceedings thereon shall be in the discretion of the court.

Section 11. It shall be the duty of every constable in any city, borough, ward or township of this Commonwealth, having knowledge of any violation of this act, or whenever requested so to do by the Dairy and Food Commissioner, his agent or attorney, or by any citizen of this Commonwealth, to make report to the court of quarter sessions of the proper county, as part of his quarterly report and return to said court, of the name of every person, firm or corporation known by him to have violated any of the provisions of this act, or alleged by the person, so giving notice as aforesaid to said constable, to have violated any of the provisions of this act, and of the names of all witnesses, furnished to said constable, whose testimony it is alleged will sustain or prove the fact of such violation. And it shall be the duty of the judge of the said court to make inquiry of all constables, at the time of the making of their quarterly returns to the court of quarter sessions, as to whether they have knowledge, and whether notice has been given to them, respectively, of any violation of this act, in accordance with the terms of this section; and whenever such quarterly reports shall contain the name of any person alleged to have violated the provisions of this act, together with the names of witnesses to prove such violations, as also the name of the person giving notice to the constable, as aforesaid, the said court shall direct the district attorney to prepare an indictment against every person so named, and call and send the witnesses, whose names have been so returned, before the grand jury then sitting, in support of the said indictment; and if a true bill shall be returned by the grand jury, thereupon to issue summary process to bring in the person so charged, to answer the matters alleged in such indictment, and thereupon proceed to trial as speedily as possible, according to the course of practice in the said court of quarter sessions.

Section 12. The Dairy and Food Commissioner shall be charged with the enforcement of all the provisions of this act; but any citizen of the Commonwealth, having knowledge or information of the violation of any of the provisions of this act, may, in the name of the Commonwealth, begin a suit for penalty or prosecution for misdemeanor, in accordance with the provisions of this act, and may prosecute to final judgment any suit or prosecution, giving notice in writing, however, to the Dairy and Food Commissioner of the commencement of such suit or prosecution immediately upon the commencement of the same, stating the nature of the proceeding and the magistrate before whom commenced, and shall in like manner report to the Dairy and Food Commissioner each successive step taken in such suit or prosecution; and such citizen shall, upon complying with the provisions of this section, be entitled to receive one-half of any penalty or fine which may be recovered in such proceeding and paid to the Dairy and Food Commissioner; and immediately upon the receipt and covering into the treasury of any such penalty or fine, recovered and paid in any proceeding commenced by a citizen, as aforesaid, the Dairy and Food Commissioner shall pay the one-half thereof to the said citizen, so commencing said proceeding and complying with the provisions of this section. Such citizen shall also be entitled to recover from the defendant his witness fees and other legal costs, as fixed by law, in said proceeding.

Section 13. The money paid into the treasury under the provisions of this act shall constitute a special fund, for the use of the Department of Agriculture in enforcing this law, and may be drawn out upon warrants signed by the Secretary of Agriculture and approved by the Auditor General; subject, however, to the payment to any citizen commencing and successfully prosecuting a proceeding for any violation of this act, under the last preceding section, of one-half of the penalty or fine so recovered in such proceeding and paid into the State Treasury.

Section 14. The Dairy and Food Commissioner, his assistants, agents, experts, chemists, detectives and counsel, duly appointed by him for the purpose, shall have full access, egress and ingress to all places of business, factories and farm buildings, carriages, cars, vessels and cans, used in the manufacture, transportation and sale of any dairy products, or of any adulteration or imitation thereof; and shall also have power and authority to open any package, can or vessel containing, or which may be supposed to contain, renovated butter, which may be manufactured, sold or exposed for sale in violation of any of the provisions of this act; and they shall also have power to take from such package, can or vessel samples for analysis, upon paying or tendering the value of such samples.

Section 15. The Dairy and Food Commissioner shall publish a semi-annual bulletin, and distribute the same in the same manner as other bulletins of the Department of Agriculture are published and distributed; which semi-annual bulletin shall contain the name and address of every person, firm or corporation to whom a license has been issued for the manufacture or sale of renovated butter, and also a tabulated statement of all the actions, civil or criminal, which have been brought for the violations of this act; giving the name and address of the defendant, and the disposition of every case.

Section 16. All parts of the act approved the fourth day of May, Anno Domini one thousand eight hundred and ninety-nine, entitled "An act to regulate the sale of butter, produced by taking original packing stock and other butter and melting the same to that the butter oil can be drawn off, mixed with skimmed milk or other material, and by emulsion or other process produce butter, and butter produced by any similar process, and commonly known as 'Boiled' or 'Process' butter; providing for the enforcement thereof, and punishment for the violation of the same," inconsistent with this act. are hereby repealed.

Approved—The 10th day of July, A. D. 1901.

COURT DECISIONS AND OPINIONS OF THE ATTORNEY GENERAL.

THE PURE FOOD LAW OF JUNE 26, 1895, SUSTAINED BY THE SUPERIOR COURT OF PENNSYLVANIA.

Commonwealth vs. William C. Curry.	Appeal from the Quarter Sessions of Chester county.

Filed April 19, 1897.

ORLADY, J.,

"The defendant was convicted on an indictment framed under the act of June 26th, 1895, P. L. 137, in which it was charged that he 'unlawfully then and there did sell and offer for sale, as and for, and in imitation of, and under the name of olive oil, used for food by man, a large quantity of a certain adulterated article and compound, the name and components of the said adulterated article and compound being to this grand inquest as yet unknown;' and in a second count 'unlawfully did then and there sell and offer for sale as and for olive oil, used for food by man, a large quantity of a certain adulterated article and compound, then and there being an inferior and cheaper substance and compound substituted for olive oil, the name and components of said adulterated, inferior and cheaper substance and compound being to this grand inquest as yet unknown.' "

The verdict was set aside and the defendant discharged by the court below; the reason given in an opinion filed was, "As there was no evidence of the sale of an adulterated article of food, but, at most an imposition or deception, the sale of one article under the name of another, and as the prohibition contained in clauses two and four of the third section are clearly not within the act as expressed in its title, and therefore unconstitutional, the verdict must be set aside and the defendants discharged."

The defendant sold "cotton seed oil" in packages labeled and marked "olive oil," and defends his conduct as lawful because the act of June 26th, 1895, known as the Pure Food Law, is misleading, in that the title does not invite an examination of the body of the bill, in which the offense charged is defined as an adulteration.

The learned judge in the opinion filed, says: "While the meaning of words depends upon popular usage, the Legislature has the right to prescribe legal definitions of its own language. But admitting this right, do not the legislative definitions quoted introduce into the body of the act entirely new and additional subjects, not clearly or at all expressed in its title, and thus violate the third section of article three, of the Constitution? Both, it is true, relate to food, but the title of the act is not to regulate the manufacure and sale of food, but is restricted to food of a certain character, namely, adulterated food, which the article sold in this case was not." The last part of this statement begs the whole question, as by the act, it and all similar articles ("Second, If any inferior or cheaper substance or substances have been substituted wholly or in part for it." Fourth, "If it is an imitation of or sold under the name of another article,") are declared and defined to be adulterations within the meaning of the act.

It is conceded that the Legislature has the right to prescribe the legal definitions of its own language. A construction put upon an act of the Legislature itself, by means of a provision embodied in the same, that it shall or shall not be construed in a certain designated manner, is binding upon the courts, although the latter, without such a direction, would have understood the language to mean something different. Endlich on Statutes, Section 365.

It is legislative language we are to construe, and it must be received, not necessarily according to its etymological meaning, but according to its popular acceptation, and especially in the sense in which the Legislature is accustomed to use the same words. Phila. & Erie R. R. C. vs. Catawissa R. R. Co., 53 Pa. 20.

The sense given to particular words by our great lexicographers is always entitled to weight, yet when a word is used in an act of Assembly, regard must be had to circumstances surrounding its use. Penna. R. R. Co. vs. Price, 96 Pa. 256.

It is contended that the term "adulteration" is given a special definition by the act by which a new and additional subject is introduced, not clearly, or at all expressed in the title, in contravention of the third section of article three of the Constitution. "No bill except general appropriation bills, shall be passed containing more than one subject, which shall be clearly expressed in its title."

We are not required to resort to the technical meaning and derivations of words as given in dictionaries to determine the legislative meaning, when the words are defined by statute, and in this case it is not inconsistent with the common acceptation.

The definition given to the word "adulteration" in this statute is so intimate and natural a connection, so evident in adjunct of the subject, and is so closely associated with the word to which it refers that it cannot be held an independent or separate subject, but fairly gives notice of the legislative purpose through the title.

The term adulteration is derived from the Latin *adultero*, which in its various inflections signifies to defile, to debase, to corrupt, to sophisticate, to falsify, to counterfeit, etc. The objects of adulteration are four-fold, namely, to increase the bulk or weight of the article, to improve its appearance, to give it a false strength, or to rob it of its most valuable constituents. All these adulterations are manifestly of a designedly fraudulent character, and therefore properly the subject of judicial inquiry. Vol. I, Enc. Brit., Am. reprint, 9th ed., p. 152. Title, Adulteration.

It was held in Commonwealth vs. Moore, 2 Pa. Superior Court R. 162, that an act, the title to which was, "An act for the protection of livery stable keepers," was constitutional, because the title fairly gives notice of the subject of the act, so as to reasonably to lead to an inquiry into the provisions of the bill, which has repeatedly been held to be sufficient, as the title thus inducing examination, accomplishes all that a more elaborate statement would give notice of. Millvale borough vs. Evergreen Ry. Co., 131 Pa. 1; Keely vs. Mayberry Township, 154 Pa. 440; and Commonwealth vs. Lloyd, 2 Pa. Superior Court R. 6, in which case "An act relating to the county Commissioners of Cambria county," was sustained, though the second section fixed the salary of each commissioner, and the third section authorized them to employ a clerk at a fixed salary; and on appeal to the Supreme Court, 178 Pa. 308, the judgment of the Superior Court was affirmed for the reasons given.

In Commonwealth vs. Robert Muir, 1 Pa. Superior Court 578, an act entitled "An act to regulate and license public lodging houses in the different cities of this Commonwealth," in which a "public lodging house" was specifically defined in limitation of the common meaning of the words, was held valid and constitutional, and on appeal to the Supreme Court, 180 Pa. 47, that tribunal says: "We have considered the provisions of the act, and are all of the opinion that the Superior Court was clearly right in holding that it is constitutional," though it contained subjects not technically covered by the title.

The title to this act, "To provide against the adulteration of food, and providing the enforcement thereof," would naturally invite inspection by any one engaged in the manufacture or sale of food, and desirous of knowing what was to be avoided in the making and trafficking in the multiform food products of this day.

The attempt to defraud the public in selling cotton seed oil under the guise of a higher priced article of an entirely different name is one of the many similar acts which necessitated the Pure Food Law, and useful and honest legislation should not be defeated by too rigid an adherence to the letter of the Constitution, or pretexts be caught at to void legislation which can be fairly reconciled within constitutional limits. It is a cardinal rule that all statutes are to be so construed as to sustain rather than ignore them; to give them operation if the language will permit, instead of treating them as meaningless and invalid. Mauch Chunk vs. Magee, 31 Pa. 433.

The title does not tend to mislead, as it invites examination by the very words used, "To provide against adulteration of food, and providing for the enforcement thereof," which reasonably embraces every food product; the different classes, kinds, modes of manufacture; and as it was a proper subject for legislative action, all persons, whether manufacturers or dealers, are attracted by the words of the title to a critical examination into the provisions of the bill.

There has been a general disposition to construe the constitutional provisions liberally, rather than to embarrass legislation by a construction whose strictness is unnecessary to the accomplishment of the beneficial purposes for which it has been adopted. Cooley's Const. Lim. 175.

In addition to the reasons herein given, we refer to Commonwealth vs. Daniel D. Jones, and Commonwealth vs. Huffnal, filed at this term, in which cases the same subject is discussed.

We do not agree with the reasoning of the learned judge below, and think the title to this act fairly gives notice of the provisions of the act, so as to reasonably lead to an inquiry into the bill.

The assignments of error are sustained. The decree of the court below is reversed, and record remitted for further proceedings thereon."

J. K. VAN DYKE ORIGINAL PACKAGE CASE.

History of the Case.

An action was begun before Magistrate Eisenbrown of Court No. 9, Philadelphia county, to recover a penalty for violation of Section 1 of an act of Assembly, approved the 5th day of May, A. D. 1899, entitled "An act to regulate the manufacture and sale of oleomargarine and butterine and other similar products, to prevent fraud and deception by the manufacture and the sale thereof as an imitation butter, etc." Judgment for $100 was entered in favor of the Commonwealth. From this judgment defendant appealed. A statement was filed in the court of common pleas, No. 4, Philadelphia county, and to this, defendant demurred. Argument was heard on the demurrer and the court, in an opinion by Arnold, P. J., overruled the demurrer and judgment was entered for plaintiff. From this judgment an appeal was taken to the Superior Court, as of October term, 1900, No. 43. The Superior Court after hearing argument thereon, sustained the judgment of the lower court.

From this decision of the Superior Court the present appeal was taken as a matter of right to this court.

Opinion of Lower Court and Superior Court.

Arnold, P. J.: "The defendant has been sued for the penalty imposed by the act of May 5, 1899, entitled 'An act to regulate the manufacture and sale of oleomargarine, butterine,' etc., and in the statement it is alleged that the defendant, as the agent of the Oakdale Manufacturing Company of Providence, Rhode Island, in the city of Philadelphia, sold in original packages shipped to him by said company, fifty pounds of oleomargarine, 'an article, product or compound made wholly or partly out of fat, oil or oleaginous substance or compound, therefore not produced from unadulterated milk or cream from the same without the admixture or addition of any fat foreign to said milk or cream, which was an imitation of yellow butter produced from pure unadulterated milk or cream of the same and containing coloring matter, and was not free from coloration or ingredients that caused it to look like butter, which said coloring matter was the same as used in the coloring of pure butter and was not deleterious to health.'

"To this statement the defendant has demurred, and for cause of demurrer assigns as reasons that he was engaged in the lawful business of a dealer in oleomargarine under the provisions of the act of Congress of August 2, 1886, and because the act of the Commonwealth of Pennsylvania of May 5, 1899, is in conflict with and in violation of the Constitution of the United States giving to Congress the exclusive power to regulate commerce between the States.

"Although the word butter when used by itself is commonly understood to mean the oily part of milk or the unctuous substance obtained from cream or milk by churning, yet it is sometimes used to designate other substances resembling butter in consistence or other equalities. When used in statutes its meaning is generally understood to be butter obtained by churning cream of milk either by hand or machinery. Sometimes it is called dairy butter and sometimes cream butter. A substance resembling it is now obtained from the fat of domestic animals and is called oleomargarine, a new word, coined for the purpose. Sometimes it is called butterine or imitation butter. Congress has undertaken to give a definition of butter and oleomargarine by the act of August 2, 1886, 24 Stat. at Large, p. 209, by which it enacted that 'the word butter shall be understood to mean the food product usually known as butter, and which is made exclusively from milk or cream, or both, with or without additional coloring matter,' and that 'certain manufactured substances, certain extracts and certain mixtures and compounds, including such mixtures and compounds with butter, shall be known and designated as oleomargarine, namely: All substances heretofore known as oleomargarine, oleo, oleomargarine-oil, butterine, lardine, suine and neutral; all mixtures and compounds of oleomargarine, oleo, oleomargarine-oil, butterine, lardine, suine and neutral; all lard extracts and tallow extracts and all mixtures and compounds of tallow, beef-fat, suet, lard, lard-oil, vegetable-oil and annotto, and other coloring matter, intestinal fat and offal fat made in imitation or semblance of butter, or when so made, calculated or intended to be sold as butter or for butter.' Oleamargarine, it was said, in Plumley vs. Massachusetts, 156 Massachusetts, 236, has naturally a light yellowish color, and it is the common knowledge of everybody that butter made from cream or milk is also of a light yellow color.

"Opposition to the manufacture and sale of oleomargarine because it comes in competition with butter, thereby reducing the price of the latter, has induced several State Legislatures to pass statutes to prevent the manufacture and sale of oleomargarine, but as it is not deleterious to health and can be made and sold for a less price than dairy or cream butter, it has overcome some of the opposition to it, and now the manufacture and sale of it are authorized by law under regulations, which 'will advise the consumer of its real character.'

"Without citing all the statutes and decisions on the subject in this State at length, we content ourselves with a brief summary of the evolution of the law on this subject. The first act appears to have been passed on May 22, 1878, 'to prevent deception in the sale of butter and cheese,' and the next on May 24, 1883, 'for the protection of dairymen and to prevent deception in the sale of butter and cheese,' but these acts proved ineffectual and were superceded by the act of May 21, 1885, which prohibited the manufacture and sale of any oleaginous substance or compound designed to take the place of butter, other than that produced from unadulterated milk or cream. This latter was held to be constitutional in the case of Powell vs. Pennsylvania, 114 Pa., 265, and 127 U. S., 678, so far as it applied to the manufacture as well as sale within the State, and, consequently, when a case arose on a sale of oleomargarine manufactured outside the State and brought here and sold in the original package, the act of 1885 was held ineffectual to prevent the sale under such circumstances, because it was an interference with the right of Congress to regulate commerce between the States: Schollenberger vs. Pennsylvania, 171 U. S., 1. Then the act of May 5, 1899, was passed, which makes it unlawful 'to sell any article, product or compound made wholly or partly out of any fat, oil or oleaginous substance, or compound thereof, not produced from unadulterated milk or cream from the same, without the admixture or addition of any fat foreign to the said milk or cream and which shall be in imitation of yellow butter, produced from pure unadulterated milk or cream of the same; with or without coloring matter: Provided, That nothing in this act shall be construed to prohibit the manufacture or sale, or offering or exposing for sale, or having in possession with intent to sell, oleomargarine or butterine or any similar substance, free from coloration or ingredients that cause it to look like butter, and in a separate and distinct form, and in such manner as will advise the consumer of its real character,' etc. The act also requires that the tub, package or parcel containing oleomargarine shall be marked and distinguished by a placard with the word 'oleomargarine' or 'butterine,' on it, and that every print or roll shall be wrapped in wrappers plainly stamped on the outside thereof with the words 'oleomargarine' or 'butterine.'

"This act does not intimate how the coloration or ingredients are to be got into the oleomargarine, whether by design or by natural causes, such as chemical changes, nor does the extent or degree of coloration seem to be of any importance. If it has any coloration or ingredients in it which 'cause it to look like butter,' its manufacture and sale are unlawful. The act is awkwardly expressed, its sentences are very much involved, and it is difficult to know their application by relation to each other. Perhaps a strict construction of the statute would prohibit the manufacture and sale of oleomargarine in its natural state because it looks like butter, but as the act is intended to repeal the prohibitory statute of 1885, and authorize the manufacture as well as the sale of oleomargarine in this State, we are to give the act such a construction as will afford the relief and prevent the mischief it is intended to prevent. The word coloration means the act or practice of coloring, or the state of being colored, and it is the act or practice of coloring oleomargarine which the act of 1899 is intended to prohibit. The use of the words 'admixture or addition' in the statute indicate that the intention of the Legislature is to prohibit the imitation of yellow butter by any admixture or addition to oleomargarine during or after manufacture.

"The statement in this case concedes that the coloring matter used in the oleomargarine sold by the defendant is not deleterious to health, so that no objection exists to it on that account, but it is alleged that it was 'an imitation of yellow butter,' and was 'not free from coloration or ingredients that caused it to look like butter which said coloring matter was the same as used in the coloring of pure butter,' so that it comes under the ban of the statute.

"The Supreme Court of the United States having decided that it is within the power of the Legislature of a State to make such prohibition and that the prohibition is not in conflict with the constitutional grant of power on Congress to regulate commerce between the States, we must follow that authority and decide accordingly. In Plumley vs. Massachusetts, 155 U. S., 461, oleomargarine manufactured in Illinois was sold in Massachusetts in violation of a statute and that State prohibiting the sale of any article, product or compound 'which shall be in imitation of yellow butter,' provided that the act should not be construed to 'prohibit the manufacture or sale of oleomargarine in a separate and distinct form, and in such manner as will advise the consumer.' The Supreme Court held that this statute was not in conflict with the commerce clause of the Constitution of the United States, and sustained a conviction based on a violation of the Massachusetts statute. In a subsequent case, Schollenberger vs. Pennsylvania, 171 U. S., 1, the same court cited Plumley vs. Massachusetts without approbation. The Legislature cannot compel the manufacturer or dealer to add any color (as for instance, pink) to his oleomargarine, as was decided in Collins vs. New Hampshire, 171 U. S., 30, but it may punish him for adding any color to his oleomargarine. This effect of the statute is that butter may be colored yellow but oleomargarine may not be so colored. The statute being enforced in the case before us is in words exactly like the Massachusetts statute; the words, 'free from coloration or ingredients that cause it (oleomargarine) to look like butter,' are found in both statutes. As it is unlawful to sell deceptive oleomargarine in Massachusetts although it is manufactured in another State, so must it be unlawful to sell it in Pennsylvania under similar circumstances.

"The demurrer is overruled and judgment given for the Common wealth for the penalty one hundred dollars and costs."

Per Curiam Opinion of the Superior Court.

"The question raised by the demurrer in the court below was whether it was lawful for a person to sell oleomargarine in the original package brought into this State from another State, which is an imitation of yellow butter produced from pure unadulterated milk or cream of the same and containing coloring matter, and is not free from coloration or ingredients that cause it to look like butter, which said coloring matter is the same as that used in the coloring of pure butter and is not deleterious to health.

"It is undisputed that this is a violation of the act of May 5, 1899, P. L. 249, entitled 'An act to regulate the manufacture and sale of oleomargarine and butterine and other similar products, to prevent fraud and deception by the manufacture and sale thereof as an imitation of butter,' etc.

"The defendant's contention is that under the provisions of the act of Congress of August 3, 1886, oleomargarine colored as described in the pleadings in this case, is a lawful article of commerce, and that the act of May 5, 1899, *supra*, so far as it relates to such sales, is in conflict with the provision of the Constitution of the United States giving to Congress the exclusive power to regulate commerce among the several States.

"As it is clearly shown in the opinion filed in the court below, this is not in any respect a new question. The act of Congress and the commerce clause of the United States Constitution, as related to an act of a State Legislature, containing provisions substantially the same as those contained in the Pennsylvania act of 1899, come under review in the case of Plumley vs. Massachusetts, 155 U. S., 461; 156 Mass., 236.

"As to the act of Congress of 1886, the Supreme Court of the United States held that the taxes prescribed by that act were imposed for National purposes, and their imposition did not give authority to those who paid them to engage in the manufacture or sale of oleomargarine in any State which lawfully forbade such manufacture or sale, or to disregard any regulations which a State might lawfully prescribe in reference to that article.

"The court further held that whilst a lawful article of commerce cannot be wholly excluded from importation into a State from another State, where it was manufactured or grown, yet a State has power to regulate the introduction of any article, including a food product, so as to insure the purity of the article imported and to prevent fraud and deception in the sale thereof; also that the State regulation under consideration in that case was a valid exercise of this power.

"This decision directly upon the point under consideration has not been overruled in any later decision of the United States Supreme Court. Its authority was expressly recognized in the case of Schollenberger vs. Pennsylvania, 171 U. S., 1., and was not questioned in the case of Collins vs. New Hampshire, 171 U. S., 30, decided at the same term. The court below, therefore, was clearly right in holding that it rules the present case. The review of the authorities contained in the opinion of its learned president renders any further elaboration by us unnecessary. The judgment is affirmed."

OWEN McCANN COLOR CLAUSE IN THE SUPERIOR COURT OF PENNSYLVANIA.

OWEN McCANN, vs. COMMONWEALTH.	No. 119, April Term, 1900. Appeal from a Judgment of Common Pleas No. 3, of Allegheny County.

Rice, P. J.

The appellant was adjudged guilty, and a judgment was entered against him by an alderman, in a suit for a penalty for selling oleomargarine in imitation of yellow butter, contrary to the provisions of the act of May 5, 1899 (P. L., 241). He was legally licensed as provided in that act, and had complied with all the requirements of the act, except that the oleomargarine sold by him was colored yellow by the addition thereto of analyne, a foreign substance, but not injurious to health. The only defense he set up on his trial was the unconstitutionality of the act. His exceptions to the record of the alderman on *certiorari* in the court below as well as assignments of error in this court, were all to the same effect.

One of the most important, as well as familiar rules for the construction of statutes is, that a legislative intent to violate the Constitution is never to be assumed; therefore, whenever a statute is susceptible of two constructions, of which the one would make it unconstitutional, the other constitutional, the latter is to be adopted. Another elementary rule is that construction is to be made of all the parts together, and not of one part only by itself. It is the duty of the courts to take a survey of the entire statute; "for the true meaning of any passage in that which best harmonizes with the subject, and with every other passage of the statute." Another rule to be noticed is that a penal statute must be construed strictly and could not be extended beyond legislature as expressed on its face. The act of May 5, 1899. needs construction and in view of the appellant's contention that the construction he puts upon it makes it unconstitutional, all these familiar principles are to be kept in mind in determining its true scope and intent. As was said by Judge Arnold, whose judgment was affirmed in Commonwealth vs. VanDyke, 13 Pa. Superior Court, 434: "The act is awkwardly expressed, the sentences are very much involved, and it is difficult to know their operation by relation to each other. Perhaps a strict construction of the statute would prohibit the manufacture and sale of oleomargarine in its natural state because it looks like butter, but as the act is intended to repeal the prohibitory statute of 1885 and to authorize the manufacture as well as the sale of oleomargarine in the State, we are to give the act such construction as will afford the relief and prevent the mischief it intended to prevent.

The word coloration means the act or practice of coloring, or state of being colored, but it is the act or practice of coloring oleomargarine which the act of 1889 is intended to prohibit. The use of the words "admixture or addition" in the statute indicates that the intention of the Legislature is to prohibit the imitation of yellow butter by any admixture or addition to oleomargarine during or after manufacture. We adopt this as the true construction of the act; and if we are correct in this conclusion none of the constitutional objections that have been urged against it can be sustained. As was said by the Superior Court of the United States, in construing the Massachusetts statute, which differs in no essential particular from ours, so it may be said here: "it will be observed that the statute * * * does not prohibit the manufacture or sale of all oleomargarine, but only such as is colored in imitation of yellow butter produced from pure unadulterated milk, or cream of such milk." If free from coloration or ingredients that "cause it to look like butter" the right to sell it "in a separate and distinct form in such manner as will advise the consumer of its real character it neither restricted or prohibited." Plumley vs. Massachusetts, 155 U. S., 462.

It is clearly shown in the opinion of Mr. Justice Harlan that the statute seeks to suppress false pretenses and to promote fair dealing in the sale of an article of food; to compel the sale of oleomargarine for what it is by preventing its sale for what it is not; to protect unwary purchasers who, without closely scrutinizing the label upon the package in which it is contained, would be induced to buy it as and for butter produced from 'unadulterated milk or cream from such milk; such being the scope and intent of the statute the contention that it is an absolute prohibition of the sale and manufacture of oleomargarine, and that the title gives no notice of such legislation, is not well founded. The act is what its title indicates, a regulation, not a prohibition, of the manufacture and sale of oleomargarine. We held in Commonwealth vs. VanDyke *supra* following Plumley vs. Massachusetts *supra* that such a regulation does not conflict with the commerce clause of the National Constitution; and upon the principles recognized in Powell vs. Commonwealth, 114 Pa. 165; 127 U. S. 648, Plumley against Massachusetts, and a multitude of other cases, it cannot be declared to be an infringement of the rights of the citizen secured by Section 1, Article 1, of the State Constitution or by the 14th amendment of the National Constitution.

The judgment is affirmed by Superior Court.

Per Curiam: The opinion of Judge Rice filed on the 26th of July, 1900, is in our view of the case, a complete and satisfactory answer to the plaintiff's contention that the act of Assembly of May 5, 1899, P. L. 241, is in conflict with Article 1, Section 1, of the Constitution of the State of Pennsylvania, and Section 1 of the 4th amendment of the Constitution of the United States.

Judgment affirmed March 11, 1901, by the Supreme Court.

COMPOUND COFFEE.

Office of the Attorney General,
Harrisburg, Pa., January 29, 1896.

Hon. Levi Wells, Dairy and Food Commissioner:

Sir: Your communication of recent date, enclosing letter of Stephens & Widlar, of Cleveland, Ohio, asking whether certain labels submitted to your Department are sufficient to protect them in the sale of coffee as a compound, which contains chicory, rye, wheat, peas and other cereals or products, under the proviso to section 3 of the act of June 26th, A. D. 1895, (P. L. 317), has been received.

The question involved is one of great importance in the construction of the provisions of the Pure Food Law. As I am informed, the above named firm imports teas, coffees and spices, and, in order to make a cheaper grade of coffee, a certain amount of chicory, wheat, rye, peas, etc., is dried, browned and ground with pure coffee. The mixture thus prepared is sold on the market under a label, "Best Rio," "Prime Rio," "French Rio," or "Broken Java." It is earnestly contended that the proviso to section 3, of the act above referred to, gives them the right to sell such a mixture or compound without incurring the penalties of the law. Acting upon this idea, certain labels containing the words "Coffee Compound," and showing that it is a mixture of prime coffee, English chicory and choice grain, are exhibited for the purpose of securing your approval so that this "Coffee Compound" may be sold in our State without interference from those in charge of the enforcement of the law.

I have no hesitancy in saying that, if such a preparation can be sold under the law as coffee, the label is sufficient under the proviso above named. But I am of the opinion that the proviso does not cover an article of food known as "Coffee Compound," such as intended to be sold by this firm, and that any manufacturing for sale, offering for sale, or selling of the same as an article of food, would be in violation of the very letter and spirit of the act referred to.

Section 3 of the Pure Food Law defines what an adulteration is within the meaning of the act of Assembly. Any article of food shall be considered adulterated, "1. If any substance or substances have been mixed with it so as to lower or depreciate or injuriously affect its quality, strength or purity. 2. If any inferior or cheaper substance or substances have been substituted wholly or in part for it. 3. If any valuable or necessary constituents or ingredient has been wholly or in part abstracted from it." These are but three of the seven kinds of adulteration named in the act. Either one of these three definitions is sufficient to brand the "Coffee Compound," offered for sale by the above named firm, as an adulteration. The addition of chicory, wheat, rye, or peas to coffee depreciates its "quality, strength and purity." It is a substitution, in part, of a cheaper substance to take the place of coffee, and it could very properly be said that in such a compound a valuable constituent has been in part, abstracted, for part of the coffee is taken away, and a cereal substituted therefor. If the "quality, strength, or purity" of coffee can thus be depreciated under the authority of the proviso to section 3 of the above act, then is the Pure Food Law a legislative dream. If this cannot be done, then any adulterated article could be sold by simply marking it a compound or mixture. Allspice ground with buckwheat hulls, or cinnamon with hemlock bark, could then be labeled "compound" and sold in the open markets as such. Such a construction would render the act of 1895 a nullity.

The Pure Food Law was intended to provide against the adulteration of articles of food, and to prevent deception and fraud in the sale thereof. The legislation was much needed, and it should be enforced in such a way as to give the greatest security to the public consistent with the requirements of the act. It is true that the proviso to section 3, above mentioned, says that it "shall not apply to mixtures or compounds recognized as ordinary articles or ingredients of articles of food." It is difficult to give any general definition of an "ordinary article of food," that would apply in all cases. It is, however, a fair presumption that no article of food, adulterated within the meaning of the definition of section 3, is intended to be exempted by the proviso. The proviso is designed to cover a different class of cases. Any one relying upon the proviso to exempt him from the penalties of the law takes upon himself the laboring oar and the burden of proof is upon him to make out the exemption claimed. What is an "ordinary article of food," within the meaning of the proviso, must depend upon the facts in each particular case. I am clearly of opinion, however, that coffee, adulterated by the addition of chicory, wheat, rye or peas, is not an "ordinary article of food" intended to be exempted from the penalties of the law. On the other hand, it is an adulteration, and cannot be sold without offending against the provisions of the Pure Food Law.

I return herewith letter and labels submitted.

Very respectfully yours,
JNO. P. ELKIN,
Deputy Attorney General.

DEFINING THE CHEESE LAW.

Office of the Attorney General,
Harrisburg, Pa., Oct. 27, 1897.

Hon. Thomas J. Edge, Secretary of Board of Agriculture:

Sir: The answer to your request for an interpretation of the act of June 23, has been very much simplified by the presence of gentlemen representing the trade. From them it was learned that at least three-fourths of the cheese consumed in Pennsylvania is manufactured out of the State, and in many instances it is impossible to ascertain the name and address of the manufacturer thereof. A jobber in New York city, for instance, may buy cheese from any other State, or even from foreign lands, and it will be impossible for him, in all cases, to know where and by whom the product was manufactured, and it would be out of the question, in such case for the wholesale or retail dealer in Pennsylvania to obtain that information.

It is contended, however, that the act of June 23, 1897, (P. L. 202), requires the dealer to brand the cheese with the words "Full Cream," "Three-fourths Cream," &c., according to the class to which it belongs, and also with the name and address of the manufacturer. This last requirement, as we have seen, is, in many instances, impossible of performance. The law does not require the performance of an impossibility. The whole purport of the act above named is doubtless to prevent the sale of any cheese not the legitimate product of pure, unadulterated milk or cream, and at the same time provide the means of identifying the person who may be responsible for a violation of the act. Suppose it were possible to label every cheese manufactured out of the State with the name and address of the manufacturer, how could that aid in protecting the consumer? The manufacturer is beyond the jurisdiction of the authorities of the State, and no punishment can be inflicted on him in case of the violation of the provisions of the act of Assembly. It would seem to be more consonant with the purpose of the act to allow the dealer in such case to mark with his name and address as dealer all such cheese, as thereby he would himself indicate his personal responsibility in case of a violation of the law.

The act also provides that the brands on the cheese shall be in "bold-faced capital letters not less than one inch in height." The gentlemen who appeared before us showed very clearly that in some cases it would simply be impossible to comply with this provision of the law, inasmuch as many cheeses are too small to allow the amount of printing in the type as required by the act. In such cases the obvious thing to do would be to come as near as possible to the requirements of the law.

With these observations I therefore advise you as follows:

1. That, in case of cheese manufactured in Pennsylvania, you should require the same to be branded "Full Cream," "Three-fourths Cream," etc., as the case may be, and with the name and address of the manufacturer thereof.

2. That in case of small cheeses, you should require the words "Full Cream," "Three-fourths Cream," etc., to be printed in large letters and allow the name and address in smaller type, which, however, should be clear and plain, and which ought not to be less than one-half inch in height in any instance.

3. In the case of cheese manufactured out of the State, it would be a sufficient compliance with the act of Assembly above named, if the dealer would brand the same in the manner indicated, with his name as dealer thereon and with his address or place of business also thereon. I am fully convinced that in this way complete effect would be given to the act, and the interests of the consumers as well as the Commonwealth would be best protected.

Very respectfully,

WILBUR F. REEDER,
Deputy Attorney General.

APPENDIX

GIVING THE

Decisions of the Department of Agriculture

ON THE

PURE FOOD ACT OF 1895,

WITH AN ABSTRACT OF THE STATUTORY REQUIREMENTS OF THE
PURE FOOD LAWS OF PENNSYLVANIA, COMMITTED TO
THE DAIRY AND FOOD COMMISSIONER FOR
ENFORCMENT, AND A LIST OF

STANDARDS AND DEFINITIONS OF FOOD SUBSTANCES.

PART I.

RULINGS ON "THE PURE FOOD LAW" OF JUNE 26, 1895.

1.—All foods manufactured, sold, offered or exposed for sale are held to be represented as pure, unless accompanied by adequate notice to the contrary, in which case they must be distinctly labeled as "mixtures" or "compounds," or as "artificial" preparations.

2.—Food sold as pure must be true to name, of standard strength, quality and purity, and not a compound, mixture or an artificial preparation or imitation.

3.—Where no standard of strength, quality or purity is fixed by law, the standard required shall be that adopted by the highest recognized authorities, such as the United States Pharmacopoeia, or the Association of Official Agricultural Chemists.

4.—No food shall have added to it any substance or ingredient "which is poisonous or injurious to health."

5.—No fraudulent or worthless article having little or no food value, shall be mixed with standard goods or substituted for them, and be sold as food under the label "compound" or "mixture;" but all foods sold under this designation must be composed of substances recognized as "ordinary articles or ingredients of articles of food."

6.—The question of the admissibility of a non-poisonous or harmless foreign substance in a food, may depend upon whether the substance introduced is necessary in order to improve the value or quality of the food, or is fraudulently added as a diluent and cheapener.

7. No food shall be sold under the name of a substance of which it contains none or only an inconsiderable quantity, and when a name is "coined" therefor such name shall not be suggestive of any substance not contained therein.

8.—Foods manufactured in Pennsylvania, except where exempt by statute from such requirement, should, for the purpose of identification, be labeled with the name and address of the person or firm manufacturing them. Foods not so marked are regarded with suspicion.

9.—Artificial preparations or imitations shall not be labeled "extracts," as "artificial vanilla extract," etc.

10.—Where such words as "compound," "mixture," "a~~rtificially colored~~," etc., are required upon a label, they shall be in conspicuous places and be printed in bold, clean-faced type in letters as large and conspicuous as any upon the package, and the same designation, both as to substance, size and conspicuousness, shall be printed upon the carton.

11.—The use, in food, of a moderate quantity of coloring matter that is not poisonous or injurious to health, is not prohibited, provided the goods are otherwise pure and of standard quality; except in the case of oleomargarine, milk, cream and distilled vinegar, in which the use of certain colors is prohibited by statute; but if used in foods below the established standard of strength and quality, the words "artificially colored" and "compound" or "mixture" must be printed upon the label.

12.—Articles of food that can be prepared by the use of improved processes, so as to preserve them from decay or change, shall have no preservative added, other than salt, syrup, sugar, saltpetre, spice, vinegar or wood smoke.

13.—When an "extract" is below standard, and yet contains a sufficient quantity of the substance after which it is named to entitle it to be labeled as a "compound" or "mixture," the percentage of its distinguishing ingredient or ingredients should be stated on its label.

14.—Dry mustard must be pure. A preparation of mustard, vinegar and spices may be sold if labeled "prepared mustard." Mustard may also be sold when mixed with vinegar, spices and sufficient starch to secure a mild flavor, if labeled "prepared mustard, compound."

15.—Mixtures of a spice with one or more of its valuable by-products, as pepper with pepper hulls, or pure cloves with cloves from which part of the essential oil has been removed, must be labeled "compound" or "mixture." Spice by-products, themselves possessed of spice value, must be sold under their own, distinctive names. Spice preparations with which any foreign material has been mixed shall not be sold as "compounds" or "mixtures."

16.—Coffee mixed with chicory, wheat, rye, peas, etc., cannot be sold as "coffee compound."—Decision of Attorney General, January 29, 1896. Packages containing such articles may be sold if they have the name of the adulterant plainly printed on the label.

17.—Candy and confections must be free from inert mineral matter, and not colored with substances poisonous or injurious to health.

18.—The distinctive character of a Baking Powder should be stated on the label, as Cream of Tartar, Alum, Acid Phosphate, etc.

19.—Tin on cans in which food is preserved, and the portion of the metal tops of glass jars which is in contact with food contents, should not contain more than two per centum of lead.

NOTE.—Under the statute a dealer is liable for selling an adulterated article, although he may have no knowledge that the same is adulterated.

A guarantee of purity received from the manufacturer or jobber does not relieve a person handling adulterated goods from liability.

PART II.

ABSTRACT OF STATUTORY REQUIREMENTS RELATING TO CHEESE; DAIRY PRODUCTS IN CHARITABLE OR PENAL INSTITUTIONS; EVAPORATED APPLES AND APPLE PRODUCTS; FRUIT JUICE; LARD; MILK AND CREAM; OLEOMARGARINE; PURE FOOD; RENOVATED BUTTER; VINEGAR.

CHEESE.

Act of 23d of June, A. D. 1897.
Amended 2d of May, A. D. 1901.

1.—Must be the legitimate product of pure, unadulterated milk or cream.—Sec. 1. Act 1897.

2.—No foreign fats or substance can be introduced.—Sec. 1; Act '97.

3.—Must be branded: Full Cream; Three-fourths Cream; One-half Cream; One-fourth Cream; Skimmed Cheese, together with the manufacturer's name and address.—Sec. 2; Act 1897.

Where cheese is manufactured outside of the State, a brand, giving the grade, together with the name and address of the dealer is sufficient.—Decision of Attorney General Oct. 27, 1897.

4. Percentage of butter fat required.—Sec. 2; Act 1897:

Full cream, 32 per cent.
Three-fourths cream, 24 per cent.
One-half cream, 16 per cent.
One-fourth cream, 8 per cent.
Skimmed cheese, less than 8 per cent.

5.—Full cream cheese shipped out of the State need not be branded.—Amendment May 2, 1901.

6.—"Fancy" cheese, under five pounds in weight, and cottage and pot cheese, are not included in the provisions of this law.—Sec. 3. Act '97.

7. NOTE.—Manufacturers or dealers in cheese violating any of the requirements of the Pure Food Law of June 26, 1895, can also be arrested and punished under its provisions.

DAIRY PRODUCTS IN CHARITABLE AND PENAL INSTITUTIONS.

Act May 23, A. D. 1893.

1.—It is unlawful for any charitable or penal institution to use or fŭrnish to its inmates any article, designed to take the place of butter or cheese derived wholly from pure unadulterated milk or cream.—Sec. 1.

Persons selling substitutes for butter or cheese, not made from pure unadulterated milk or cream, are also liable to prosecution for every such offense.—Sec. 2.

EVAPORATED APPLES AND APPLE PRODUCTS.

Act of July 5, A. D. 1895.

1.—The adulteration of "apple vinegar." "jellies," cider," evaporated apples" and "other apple products," is prohibited.—Sec. 1.

2. NOTE.—Persons violating the requirements of this law can also be prosecuted under the provisions of the Pure Food Law of June 26, 1895.

FRUIT JUICE.

Act May 2, A. D. 1901.

1.—No "deleterious" or "poisonous acid" or other "unwholesome, deleterious or poisonous substance" can be sold or given away as a substitute for the pure, unadulterated and unfermented juice of lemons, limes, oranges, currants, grapes, apples, peaches, plums, pears, berries, quinces, or other natural fruits, under the representation that such preparation is the pure, unadulterated and unfermented juice of any such fruits.—Sec. 1.

2.—No one shall knowingly use any such compound in the mixing, decoction of, or preparation of, food or drink, or any such compound or preparation in the place of, or as a substitute for, the pure unadulterated and unfermented juice of one or more such fruits.—Sec. 1.

LARD.

Act June 8, A. D. 1891.

1.—Lard sold as such must be the pure fat of swine.

2.—Lard not wholly derived from the fat of swine, must be sold in packages or wrappers on which is plainly marked on the outside in letters not less than one-half inch in length, the words "Compound Lard."

3. NOTE.—Action can also be brought against persons who sell impure or adulterated lard, under the Pure Food Act of June 26, 1895.

MILK AND CREAM.

Act of 19th April, A. D. 1901.

1.—The addition of coloring matter or preservatives, to milk or cream, is prohibited.—Sec. 1.

2. NOTE.—Action can also be brought against persons who sell impure or adulterated milk, under the Pure Food Law of June 26, 1895.

OLEOMARGARINE.

Act of 29th May, A. D. 1901.

1.—Oleomargarine is any substance "made wholly or partly out of any fats, oils or oleaginous substance or compound thereof not produced from pure unadulterated milk or cream from the same, without the admixture or addition of, any fat foreign to the said milk or cream."—Sec. 1.

2.—Oleomargarine "shall be made and kept free from all coloration or ingredients causing it to look like yellow butter."—Sec. 1.

3.—All persons "desiring to manufacture, sell or offer or expose for sale, or have in possession with intent to sell, oleomargarine not made or colored in imitation of yellow butter, must first procure a license so to do, from the Dairy and Food Commissioner."—Sec. 2.

4.—All licenses expire December 31st of each year. Licenses may be granted for a portion of a year upon payment of a proportionate part of the annual fee.—Sec. 2.

5.—License fee for twelve months for a

Manufacturer,	$1,000
Wholesale dealer,	500
Retail dealer,	100
Restaurant, dining room or hotel proprietor,	50
Boarding house keeper,	10

—Sec. 2.

6.—Wholesale dealers, are all persons who shall buy to sell again and make sales in quantities of ten pounds and over.—Sec. 2.

7.—Retail dealers, are all persons who sell in quantities of less than ten pounds.—Sec. 2.

8.—License is granted for a specified location only, but may be transferred to another individual proposing to engage in business in the same place, on application to the Dairy and Food Commissioner.—Sec. 2.

9.—The license must be exhibited in a conspicuous place, on the walls of the room or store in which the business is conducted.—Sec. 3.

10.—Every person, firm or corporation, before beginning business under this law, shall procure from the Dairy and Food Commissioner a sign or signs clearly setting forth that he, she or they, are engaged in the manufacture or sale of oleomargarine; which said sign or signs shall be hung up in a conspicuous place or places on the walls of every room or store in which oleomargarine is manufactured or sold. —Sec. 3.

11.—Every proprietor of a hotel, restaurant, dining room or boarding house, shall, in addition, have conspicuously placed upon every counter or table at which food, meals, or refreshments, are served to customers, a placard, plainly printed in letters not less than one-half inch in length, stating that oleomargarine is used and served to customers.—Sec. 3.

12.—Every tub, package or parcel containing oleomargarine shall be distinguished on the outside, in a conspicuous place, by a placard with the word "OLEOMARGARINE" printed thereon; the letters to be not less than one inch long, and the placard shall not contain any other words thereon.—Sec. 4.

13.—Upon every open tub, package or parcel containing oleomargarine there shall be displayed, in a conspicuous position, a placard with the word "OLEOMARGARINE" printed thereon in letters not less than one inch long; and when oleomargarine is sold from such tub or package or otherwise at retail, in print, roll or other form, before being delivered to the purchaser, it shall be wrapped in wrappers plainly stamped on the outside thereof with the word "OLEOMARGARINE" printed or stamped thereon in letters one-fourth inch square. The wrapper shall also contain the name and address of the seller and the quantity sold, and no other words thereon, and the said word "OLEOMARGARINE," so stamped or printed on said wrapper, shall not be in any manner concealed.—Sec. 4.

14.—Manufacturers and wholesale dealers in oleomargarine shall keep a book in which every sale and shipment of oleomargarine shall be entered, giving the date of sale and shipment, the quantity, the person to whom sold and shipped, the place to which shipped and the name of the transportation line by which shipped, which book shall be in such form as the Dairy and Food Commissioner shall direct and shall be open to examination by the Dairy and Food Commissioner, his agents, attorneys and representatives.—Sec. 5.

15.—Retail dealers in oleomargarine shall also keep a book, which shall be open to examination by the Dairy and Food Commissioner, his agents, attorneys and representatives, in which shall be entered the date of the receipt of all purchases of oleomargarine by him, stating therein where, when and from whom purchased, and the quantity; said book to be in such form as the Dairy and Food Commissioner shall direct.—Sec. 5.

PURE FOOD LAW.

Act of June 26, A. D. 1895.

1.—The manufacture, sale, offering for sale or selling adulterated food is prohibited.—Sec. 1.

2.—The term "food" as used in this act "shall include all articles used for food or drink by man, whether simple, mixed or compound." —Sec. 2.

3.—An article shall be deemed to be adulterated within the meaning of this act,

(a) IN THE CASE OF FOOD:

(1) If any substance or substances have been mixed with it, so as to lower or depreciate or injuriously affect its quality, strength or purity.

(2) If any inferior or cheaper substance or substances have been substituted, wholly or in part, for it.

(3) If any valuable or necessary constituent or ingredient has been, wholly or in part, abstracted from it.

(4) If it is an imitation of, or is sold under the name of, another article.

(5) If it consists, wholly or in part, of a diseased, decomposed, putrid, infected, tainted or rotten animal or vegetable substance or article, whether manufactured or not—or in case of milk, if it is the product of a diseased animal.

(6) If it is colored, coated, polished or powdered, whereby damage or inferiority is concealed, or if by any means it is made to appear better or of greater value than it really is.

(7) If it contains any added substance or ingredient which is poisonous or injurious to health: Provided, That the provisions of this act shall not apply to mixtures or compounds

recognized as ordinary articles, or ingredients of articles of food, if each and every package sold or offered for sale be distinctly labeled as mixtures or compounds, and are not injurious to health.—Sec. 3.

RENOVATED BUTTER.

Act 10th of July, A. D. 1901.

1. "Taking original packing stock and other butter and melting the same so that the butter oil can be drawn off, mixed with milk or skimmed milk or other material, and by emulsion, or other process, produce butter, and butter produced by any similar process and commonly known as boiled or process butter," shall be known and designated as "Renovated Butter."—Sec. 1.

2.—Persons desiring to engage in the business of manufacturing or selling renovated butter are required to take out a license, to be issued by the Dairy and Food Commissioner.—Sec. 2.

3.—All licenses expire December 31st of each year. Licenses may be issued for a portion of a year upon payment of a proportionate part of the license fee.—Sec. 2.

4.—The license fee for twelve months is for a

Manufacturer,	$1,000
Wholesale dealer,	500
Retail dealer,	100
Restaurant, dining room or hotel proprietor,	50
Boarding house keeper,	10

—Sec. 2.

5. Wholesale dealers are all persons who sell in packages of ten (10) pounds or over.—Sec. 2.

6.—Retail dealers are all persons who sell in quantities of less than ten (10) pounds.—Sec. 2.

7.—Hotel and dining room proprietors, and restaurant and boarding house keepers, are regarded as dealers.—Sec. 2.

8. The license is for a specified location and must be exposed to view in a conspicuous place.—Sec. 2.

9.—Renovated butter cannot be sold from wagons on the streets or from house to house.—Sec. 3.

10.—A sign or signs must be displayed, setting forth that Renovated Butter is manufactured or sold, and posted in a conspicuous place.—Sec. 4.

11.—A placard also must be placed in a conspicuous place on every counter or table where meals are served to customers, by every restaurant or boarding house keeper or hotel or dining room proprietor, stating that "Renovated Butter" is used or served to customers.—Sec. 4.

12.—A stencil to be furnished by the Dairy and Food Commissioner, to every manufacturer and wholesale dealer in renovated butter, giving the number of the license and the name and address of the holder thereof, shall be used in stamping every package before being sold by the manufacturer or wholesale dealer to the retailer.—Sec. 4.

13.—Every tub, package or parcel containing renovated butter, shall be distinguished on the outside, in a conspicuous place, by a placard with the words "Renovated Butter" in letters not less than one-half inch long, and the placard shall not contain any other words, printing or device thereon.—Sec. 5.

14.—Upon every open tub or package shall also be displayed a sign or placard, with the words "Renovated Butter" printed thereon in letters not less than one-half inch long, and when renovated butter is sold from such package, before being delivered to the purchaser, it shall be wrapped in a wrapper plainly stamped on the outside thereof with the words, "Renovated Butter," in letters one-fourth inch square, and the wrapper shall contain no other words or printing thereon, and the words shall be kept in plain view.—Sec. 5.

15.—Manufacturers and wholesale dealers in Renovated Butter, shall keep a book in which every sale and shipment shall be entered, giving the quantity and person to whom sold and shipped, the place to which shipped and the name of the transportation line by which shipped, which book shall be open to examination by the Dairy and Food Commissioner, his agents, attorneys and representatives.—Sec. 6.

16.—Retail dealers also shall keep a book, which shall be open to the inspection of the Dairy and Food Commissioner, or his agents, in which shall be entered the date of the receipt of all purchases of Renovated Butter, made by him, and stating where, and from whom purchased, and the quantity.—Sec. 6.

VINEGAR.

Act of June 18, A. D. 1897.
Amended May 21, A. D. 1901.

1.—Vinegar sold as "apple" or "cider" vinegar must be the legitimate product of pure apple juice. No foreign substance, drugs or acids can be introduced.—Sec. 1; Act 21st May, 1901.

2.—Vinegar branded "Fruit Vinegar" must be made wholly from grapes, apples or other fruits.—Sec. 1; Act 21st May, 1901.

3.—Vinegar made by "fermentation" or "oxidation" not distilled shall be branded "fermented vinegar," with the name of the fruit or substance from which it is made.—Sec. 2; Act 21st of May, 1901.

4.—Vinegar made wholly or in part from distilled liquor, must be branded "distilled vinegar."—Sec. 2; Act 21st of May, 1901.

5.—Distilled vinegar must be free from coloring matter and must contain not less than four per centum, by weight, of absolute acetic acid.—Sec. 2; Act 21st of May, 1901.

6.—All vinegar must be made from the fruit or grain from which it is represented to be made and shall contain no foreign substance, except an amount of spice necessary for flavoring, provided the spices do not color the vinegar.—Sec. 2; Act 21st of May, 1901.

PART III.

FOOD DEFINITIONS AND STANDARDS.

MEAT.

1.—MEAT is the dressed and properly prepared edible parts of animals, in good health at the time of slaughter, and of the kind designated.

2.—Refrigeration is the only method of preservation allowable for fresh meats.

3.—CANNED MEATS shall contain no preservative other than salt, sugar and salt-petre, except smoked meat, which contains the products added by the process of smoking.

4.—PICKLED AND SALTED MEATS shall contain no preservatives other than salt, sugar, salt-peter, vinegar, spices or other condiments.

5.—SAUSAGE must be prepared from meat of the quality above indicated, and must contain no preservatives other than sugar, salt, salt-peter, smoke and condiments; artificial color must not be introduced without notice of the fact.

6.—MEAT EXTRACTS must be true to name. No antiseptic, other than salt, may be used.

MILK AND BUTTER.

1.—MILK is the normal secretion, taken by complete milking, from the udder of a healthy cow, properly fed and kept. Colostral milk is excluded.

2.—CREAM shall contain not less than 15 per centum of butter-fat.

3.—SKIM-MILK, except in cities for which a different standard has been established by law, shall contain not less than 8.5 per centum of total solids not fat, and shall be free from all kinds of additions.

4.—BUTTER-MILK. The acid fluid of milk or cream left after the removal of the butter fat by churning. It must be free from preservatives other than the salt employed in the manufacture of butter.

5.—**Condensed milk** shall be prepared from pure and wholesome normal milk, by removal of water by evaporation; sugar may be added, but no other substances.

6.—**Butter** must contain not less than 83 per centum of butter-fat.

FRUIT PREPARATIONS.

1.—**Fruit-butter** must be prepared wholly from the designated fruit without addition of any substance other than cider, glucose or cane-sugar and spices.

2.—**Fruit preserves, jams, marmalades and jellies** must be prepared from the designated fruits and cane-sugar, with or without the addition of glucose, but without the addition of any other substance.

3.—**Fruit juice, fresh,** is the juice, or pulp, or both, of fresh, sound fruit of the variety specified on the label, without addition of any other substance.

4.—**Fruit juice, sweet,** is fresh fruit juice to which sugar or glucose has been added.

SACCHARINE PRODUCTS.

1.—**Molasses** is that part of the cane juice, or sugar solution, that is left upon the removal of part of the sugar. It must contain no added substance.

2.—**Syrup** is the purified or evaporated juice of the cane or maple sap, insufficiently evaporated to cause crystallization of the sugar. It must contain no added substance.

3.—**Glucose** is the solid, sweet, purified substance obtained by the action of acid on starch. It must be free from intermediate products.

4.—**Glucose syrup,** is syrup obtained by the action of acid on starch.

5.—**Honey** is the nectar of flowers and saccharine exudations of plants, gathered by bees. Honey made by feeding bees sugar, glucose, syrup or other saccharine substances, is not considered pure honey. The mixing of sugar, syrup, glucose or other similar substance with honey, is considered an adulteration.

SPICE AND CONDIMENTS.

1.—ALLSPICE OR PIMENTO, is the dried fruit of *Pimenta officinalis.*

2.—BLACK PEPPER is the dried, immature berry of *Piper nigrum.* Pepper shells, pepper dust, and other by-products from pepper are adulterants.

3. WHITE PEPPER is the dried mature berry of *Piper nigrum* from which the outer, or the outer and inner coatings have been removed.

4.—CAYENNE PEPPER, red pepper, is the dried fruit of *Capsicum fastigiatum*, *C. frutescens*, *C. baccatum* or other small-fruited species of *Capsicum.*

5.—CINNAMON is the dried bark of any species of the genus *Cinnamomum*, from which the outer layers may or may not have been removed.

6.—GROUND CINNAMON OR GROUND CASSIA: A powder consisting of cinnamon, cassia buds or a mixture thereof.

7.—CLOVES are the dried flower-buds of *Jambosa caryophyllus;* should contain no more than 5 per cent. of clove stems.

8.—GINGER is the washed and dried or decorticated and dried rhizome of *Zingiber officiniale.* Ground ginger shall not contain any added substance, but whole ginger coated with carbonate of lime may be sold as limed or bleached ginger.

9.—HORSE-RADISH the root of *Cochlearie armoracia;* the grated or ground horse-radish may be mixed with vinegar, but with no other foreign material.

10.—MACE is the dried arillus of *Myristica fragrans; Macassar* or *Papua mace* the dried arillus of *M. argeneta*, should be sold under its own name; *Bombay* mace, *M. Malabarica* has no spice value and is therefore an adulterant.

11.—MUSTARD: SEED, the seeds of *Sinapis alba* (white mustard). *Brassica nigra*, (black or brown mustard). *S. juncea* (sarepta mustard).

12.—MUSTARD: GROUND, is the powdered mustard seed, of one or more varieties, with or without the removal of the hulls and a portion of the oil, but without addition of any other substance.

13.—NUTMEG is the dried seed of *Myristica fragrans*, deprived of its testa; ground nutmegs should contain no added substance; "liming" whole nutmegs is not to be considered an adulteration.

FLAVORING EXTRACTS.

1.—LEMON EXTRACT shall contain at least five per centum of the pure oil of lemon dissolved in alcohol.

2.—Vanilla extract is the solution prepared by the maceration of the vanilla bean with alcohol and sugar.

TABLE BEVERAGES.

1.—Tea is the dried leaves of *Thea sinensis* or other species of *Thea*, without addition of the leaves of other plants or of coloring materials injurious to health, and without having been exhausted by steeping or other means.

2.—Coffee is the fruit of *Coffea arabica.* "Roasted coffee" is coffee that has been subjected to dry heat to develop the aroma.

3.—Chocolate is the ground pulp of the roasted seeds of *Theobroma cacao*, from which none of the fat has been removed.

4.—Cocoa is the ground pulp of the roasted seeds of *Theobroma cacao* from which a part of the fat has been removed, but to which nothing except the usual flavoring material has been added.

5.—The addition of sugar to either chocolate or cocoa should be indicated on the label.

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